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**PRIVATE SECTOR PARTICIPATION IN SOLID WASTE MANAGEMENT
IN THE WA TOWNSHIP**

DIGADAM AKIANUGE CYNTHIA



2020

UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

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IN THE WA TOWNSHIP**

BY

DIGADAM AKIANUGE CYNTHIA

(UDS/MDS/0395/16)

UNIVERSITY FOR DEVELOPMENT STUDIES



**THIS THESIS IS SUBMITTED TO THE DEPARTMENT OF AFRICAN AND
GENERAL STUDIES, FACULTY OF INTEGRATED DEVELOPMENT STUDIES,
UNIVERSITY FOR DEVELOPMENT STUDIES, IN PARTIAL FULFILMENT OF
THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY
DEGREE IN DEVELOPMENT STUDIES**

JUNE, 2020

DECLARATION

I, Digadam Akianuge Cynthia, hereby declare that except for references to other people's works which have been duly acknowledged, this work is the result of my own research carried out in the Faculty of Integrated Development Studies, University for Development Studies.

Signature..... Date

NAME OF STUDENT: **DIGADAM AKIANUGE CYNTHIA**

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this research project were supervised in accordance with the guidelines on supervision of theses/dissertations laid down by the University for Development Studies.

Signature..... Date

NAME OF SUPERVISOR: **PROFESSOR ISSAKA KANTON OSUMANU**



ABSTRACT

This study examined private sector participation in the management of solid waste in the Wa Township using mixed methods. Heads of 382 households were for questionnaires survey, in-depth interviews were conducted with key stakeholders connected to solid waste management, and focus group discussions were held with community leaders. The study revealed residential source of solid waste was crucial with several waste generated (food waste, plastics, glass and metallic and textile) and numerous disposal practices (open dumping, communal collection). The study revealed that the private sector had relatively competitive advantages in the management of solid waste. The study reveals that solid waste collection and disposal have improved since the private sector immersion in solid waste management in the Township. The study affirmed that the capacity of the private sector in terms of equipment and operational qualities for higher level performance is on the rise. Despite all the performances of the private sector, several challenges with solid waste management were unveiled. A Relative Important Index conducted ranked operational challenges, township challenges, and organizational challenges as 1st, 2nd and 3rd respectively. The study concludes that solid waste management can further improve with adequate supply of waste bins, and skips to facilitate regular collection of waste by the private sector. It recommends prompt payment of monies meant for private operators to intensify their monitoring system to avoid shoddy work.



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DEDICATION

To my dearly cherished parents and siblings.

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To Almighty God be the glory for the strength and great things he has done for me in pursuing this research study for my MPhil Degree in Development Studies. This study would not have come to completion without mammoth support and positive comments from my supervisor. I am thankful to my supervisor Professor Issaka Kanton Osumanu for his priceless support, time, guidance, and helpful comments. This thesis has come to completion not only by my own effort but also through the support received from Mr. Morna Baba Paul and Madam Freda Naatu. I appreciate the irreplaceable support and cooperation from the Directors and Staff of the following institutions: Wa Municipal Assembly, Wa Health Directorate, Urban Waste Department Wa, the Environmental Department for their support for providing data and responding to interviews and questionnaires. I am grateful to all my interpreters who made this research in all the clusters possible through their assistance in the field data collection. To my parent, and other siblings and those I may have forgotten to mention, I say thank you.



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LIST OF ACRONYMS

CCC	Communal Container Collection
EPA	Environmental protection Agency
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HtH	House-to House
LMIC	Low and Middle Income Countries
MLGRD	Ministry of Local Government
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NPM	Novel Public Management
PSI	Private Sector Involvement
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Service Solution
SWM	Solid Waste Management
UNEP	United Nation Environmental Program
WMA	Wa Municipal Assembly



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CHAPTER ONE

INTRODUCTION

1.1 Study Background

The problem of solid waste and other sanitation issues of urbanization emanates from the persistent increase in the city's population growth and development (Dinye, 2015). The more than 50% population residing at the urbanized regions worldwide has become a reality in recent times. This indicates that the unprecedented urbanization rate is without a doubt and estimated to peak at 60% by 2030 in the Sub-Saharan (UN-Habitat, 2010; Oteng-Ababio, 2014). For instance, it was further indicated that worldwide population has progressed from three billion to seven billion in 1950 and 2011 respectively. These trends of population increase initiate urbanization with waste generation becoming inevitable and the management very crucial for the health situation of the world, Africa and Ghana.

In Ghana, the drift of urbanization has been on ascendancy since independence. Sustained urbanization and population growth in Ghana over five decades nationwide glimmered off an increase in household population, towns and cities expansion with resurgence urbanization proportional to waste generation (Kasanga and Avis, 1988). Ghanaian major cities, relative to other major unindustrialized countries cities, faces similar and innumerable glitches in their solid waste management. Waste management, a major component of environmental sanitation, has over the year-to-date, being a problem of successive central governments and local authorities with the aim of addressing the health needs of Ghana (Agyepong, 2011). In many developing worlds the rapid urbanization growth has impacted by increasing consumption of resources and goods that increases the amount of waste generation across the cities and the various households.



The pursuit for proper solid waste management options in sub-Saharan Africa has engaged the attention of governments, the private sector, and individuals, though some challenges are inevitable regarding waste management (Owusu-Sekyere, 2013). Due to weak institutional capacities and the inadequacy of human and capital resources, the management waste and sanitation levels many developing cities of the world are in deplorable state particularly in Africa. The private sector participates to ensure the effective achievement of the health goals of citizens (Tia, 2012). However, GEPA (2002) indicated that all kinds of waste, regardless of their nature, are being dumped indiscriminately into depressions, sandpits, old quarries, beaches, drains and even in certain areas, along streets, without due regards to the nuisance and harm caused to the environment leaving the state institutional structures difficult to manage the increasing indiscriminate generation and disposal of waste.

However, Ghana's major cities and towns high population concentration has increased pressure on urban infrastructure and services. The demand for environmental services, such as water and waste management, has increased tremendously (Songsore et al., 2005). Hence most of the urban landscape in Wa are characterized by open spaces and roadsides littered with refuse; drainage channels and gutters choked with waste; open reservoirs that appear to be little more than toxic pools of liquid waste, and this confirms why Owusu-Sekyere et al. (2013) suggested that waste is mismanaged in Wa. This has become a conundrum and the public sector alone cannot manage waste. The social and health impact of this neglect is greatest among the poor, particularly those living in low-income settlements (UN-Habitat, 2010) because they lack the necessary capacity to deal with the implication of poor waste disposal systems.



The high concentration of people in the evolving Town (Wa) has implications for solid waste generation (Oteng-Ababio, 2014). The management of solid waste bears an increasingly demanding challenge for residents and governments globally. Scholarly works such as Annez et al. (2010) and Owusu-Sekyere (2014) have made a strong conviction on how the disregarded resources could be treasured when handled properly. As a source of generating income solid waste scavengers move across the major cities in Ghana such as Accra, Kumasi, Tamale and Wa, for plastic waste materials. These materials include scrap metals waste, electronic waste and others. This waste pickers are mobile and their work has not only been recognized as income generating but a source of raw material provision to the metal and plastic industries (Wiafe, 2014). In the cases of Municipal Wa, solid waste management has ever been considerably by the authorities and other waste management departments.

In responds to dealing with low service delivery by the public sector, the Ministry of Local Government and Rural Development (MLGRD) produced an Environmental Sanitation Policy Act in 1999 and revised in 2010, which required to reorganization of the solid waste managements in Ghana. This further allow the private sector to fit in for the participation of solid waste management considering the collection, transport and disposal challenges by government in the majorities and towns of the country (Tia, 2006). Against this situation, city authorities in the country have not been able to keep bound with the growing waste disposal needs of the areas under their jurisdiction. The lack of proper solid waste disposal services has resulted in waste accumulation and unsanitary environmental conditions in many parts of these cities and some major towns. As such the study seeks to investigate how the private sector is participating in solid waste management in Wa.



1.2 Problem Statement

Several studies have been conducted on the role of private sector participation in solid waste management in Ghana aiming at effective and efficient ways of controlling the menace, yet in their effort to provide lasting solutions to this problem, there is still more to be done (Yahaya and Owusu-Sekyere, 2012; Oduro-Kwarteng, 2011; Oteng-Ababio, 2009). For example, the United Nation Conference on building partnership for moving towards zero waste 2011 affirmed problems of solid waste management intensifying, practically in all communities of the world today (Vaughn, 2011). A study by Joshi and Ahmed (2016) revealed a positive relationship between population growth, urbanization, and waste generation mostly in developing countries like Ghana, Nigeria among others.

Urbanization in Ghana has posed a serious challenge to metropolitan, municipal and district assemblies mandated to manage solid waste. Fobil et al. (2010) allude that over ten thousand metric tons of finished plastic products are imported annually into Ghana. It is important to note that about 40 plastic manufacturing companies producing about 26,000 metric tons of assorted plastic products annually into Ghana have contributed to the uncollected waste clogs (Fobil, 2001; Owusu-Sekyere, 2013). However, the wastes generated from these plastics impact negatively on the environment emanating from very poor management practice in fast-urbanizing cities in Ghana. Also, a report on the Kumasi Metropolitan Assembly (KMA) (2010) revealed that about 16.5% plastic waste generated daily is expected to increase, because, in Ghana drinking water, alcoholic and non-alcoholic beverages among others come in plastic bags and bottles. These plastic bags and bottles are discarded indiscriminately after gulping down the liquid content.



Insightfully, the Ghana Health Service (GHS) has indicated that six out of the top ten diseases in Ghana are related to poor environmental condition (including increasing waste mismanagement). Such diseases include malaria, diarrhoea and typhoid fever jointly constituting 70% - 85% of out-patient cases at health facilities (MLGRD, 2010a). This, therefore, affects the quest to achieve goal three (3) and six (6) of the Sustainable Development Goals (SDGs). Whereas the local government ministry and Rural Development has a supervisory role over the Metropolitan, Municipal and District Assemblies by providing the general policy framework for waste management in Ghana. Managing Solid waste effectively and efficiently is without a continually growing problem at the regional and local levels due to ineffective participation of the private sector.

The Wa Township has open spaces which are littered with refuse; gutters choked with waste; open reservoirs that appear to be little more than toxic pools of liquid waste and plastic waste. The social and health impact of poor waste management in Wa Township is questionable. Literature suggests that the Challenges of Privatizing Waste Management in the Wa Township of Ghana delved into waste storage facilities, waste management agencies, and perception of the public on waste management services (Yahaya and Owusu-Sekyere, 2012). Tia (2012) stated that skip containers are often abandoned with refuse overflowing for several weeks due to the dumping of solid waste indiscriminately and burning of skips with solid waste. Domestic wastes account surpasses management capacities couple with the existing landfill site reaching its full capacity. In response to the problem of low service delivery by the public sector in managing waste, MLGRD has implemented policies on private sector participation in the management of solid waste in Ghana (Tia, 2006).



Private partnership like the ZoomLion/Urban Waste and the Government of Ghana in managing solid waste has played a pivotal role in combating the menace (Akaateba and Yakubu, 2013). The findings of Amoah and Kosoe (2014) indicate that the Wa Municipal Assembly had tried collecting waste over the years to keep Wa Township clean. Despite these interventions by the government and other private agencies, a recent report by the Wa Municipal Assembly (WMA) (2015) disclose that over 90% of all solid waste generated are dumped severally in an open dumpsite doted in the Wa Township. This has escalated solid waste situation in Wa Township and further worsening the intractable and threatening public health of the people in Wa. Although, there had several studies on waste management in the Wa Town, there is a paucity of studies on private sector participation on solid waste management. Therefore, the study sought to ascertain how the private sector participates in the managements of solid waste in the Wa Township of Ghana.



1.3 Research Question

1.3.1 Main Research Question

How does the private sector participate in solid waste management in the Wa Township?

1.3.2 Specific Research Questions

- i. What are the factors that influence private sector participation in solid waste management in the Wa Township?
- ii. What strategies are used by the private sector in solid waste management in the Wa Township?
- iii. How effective is the private sector in solid waste management in the Wa Township?

- iv. What are the challenges facing the private sector in managing solid waste in the Wa Township?

1.4 Objectives of the Study

1.4.1 Main Objective

To assess the participation of the private sector in solid waste management in the Wa Township.

Specific Objectives

- i. To examine the factors influencing private sector participation in solid waste management in the Wa Township.
- ii. To assess the strategies used by the private sector in solid waste management in the Wa Township.
- iii. To assess the effectiveness of the private sector in solid waste management in the Wa Township.
- iv. To analyze the challenges facing the private sector in managing solid waste in the Wa Township.



1.5 Scope of the Study

The study was conducted in the Wa Municipal, the capital town of the Upper West Region of Ghana where urbanization is becoming an inevitable phenomenon and solid waste management is crucial. The study concentrates on the private sector participation in solid waste management in the Wa Township. Its emphasis is on the nature of waste in the township, which influences households and individuals to dispose of waste indiscriminately. Also, the study examines measures put in place by the private sector in the management of solid waste as well as the challenges

confronting them. This study drew insights from the Sustainable Development Goals 3 and 6 as the central theme to ensure effective development at the longer run. Goal 3 seeks to ensure good health and promote well-being for the citizenry at all ages while goal Six seeks to promote water and sanitation availability and its management for everybody. All member countries are entreated to work towards achieving this vital goal. However, the situation in developing countries in especially Africa is not a healthy one.

1.6 Significance of the Study

It is very essential for research of this standard to be conducted, though several studies have been done on the waste management (Solid) linking to the private sector. This scholarly work quest to explain how the private sector participates in solid waste management in Wa Township is challenged and the strategies they adopt in managing solid waste. Waste management in Wa has accounted for positive social, environmental and cultural effects which have implications on productivity hence its management is crucial. It is expected that the findings of this study will become a very useful working document for addressing a large proportion of the issues of urbanization and harnessing its potentials for growth and development in Wa through waste recycling and reuse.

Also, the study will help authorities to plan and provide avenues for the complete private sector participation in Waste management because population growth urbanization and waste generation are inextricably connected. The study serves as a useful document which will assist traditional authorities in Wa to effectively manage waste with facilities to the advantage of themselves and their respective communities. It will also guide policymakers to make informed and appropriate policies on the



management of waste and to encourage private sector participation as a way of maintaining the green environment in and around Wa. The study revealed appropriate measures and policies that can help or encourage the private sector to actively participate in the management of waste.

1.7 Organization of the Study

The study is organized into five chapters. Chapter one includes the background, problem statement, research questions, objectives, the scope of the study, justification, the methodology used, data collection tools, data analysis and presentation, and the sampling techniques. Chapter two reviews existing literature in relation to private sector participation in MSWM, the effectiveness of the private sector in MSW disposal and management and the challenges of the wastes management institutions in the country as well as the Wa Township. Chapter three presents a brief profile of the study area and the analysis of the topic of the study which includes geographic characteristics, historical, demographic as well as economic issues. Chapter four forms the focal point of the study; it will present the analysis and findings of the study. Finally, chapter five summarizes the major findings, subsequent conclusion, and recommendations to the study.

1.8 Delimitation of the Study

For the purpose of time and resource used, the work was limited to the six clusters of the Wa Township. In the study's quest to examine private sector participation in solid waste management in the Township, it has been confronted with numerous challenges which affected the study processes. First, financial and logistical problems: considering the geographical size of Wa Township and the locations of some selected



clusters it was very difficult getting all the necessary financial and logistical resources to travel to various clusters for data. Another problem was also time constraints. Research of such type requires a longer period but the institution had barely a few months to complete such a comprehensive study. However, the challenges were addressed. This notwithstanding, such challenges were dealt with in the area of soliciting for funds from siblings, contacting relevant key informants who helped in the collection of accurate data.

1.9 Chapter Summary

This chapter presented the general overview of the study by introducing it from various angles to make it a meaningful document which will contribute to national development. The discussion of the problem which makes a brief description of the issues that need to be addressed while the scope and the significance of the study indicate the specific areas of operation and the reasons why this thesis worth doing respectively in the study area.



CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL ISSUES

2.1 Introduction

This chapter entails the review of related current literature, the conceptual framework and theoretical frameworks for the study. In part is the presentation of the literature review relative to the research objectives. Sectionalizing the content, the first section of the conceptual issues related to solid waste management including private sector participation. Subsequent reviews are on the historical overview of Ghana's solid waste management, whereas other part focuses on themes teased out from the research objectives. The focus was on the nature of solid waste generated, factors that influence household solid waste disposal, strategies that are used by the private sector in solid waste management and, finally, the challenges facing the private sector in managing solid waste production in Ghana.

2.2 Conceptual Overview

2.2.1 Solid Waste Management

In a more comprehensive way solid waste management (SWM) covers all the processes involving the collection of solid waste, treatment and final disposal of the waste generated at the household level, institutional level, community level and industrial level that are not harmful to humankind in the waste management process (Tchobanoglous et al., 1993). In themes solid waste activities are grouped into 6 functional elements which includes: solid waste generation and characterization, (this covers site storage and handling of solid waste, collection and transfer of solid waste and transport, separation and processing, treatment and resource recovery of solid waste, as well as final disposal of solid waste (Tchobanoglous et al., 1993).



There is the need for an appropriate planning and functional powers on the side of management that will help achieve quality of service. Schubeller et al. (1996) indicated that solid waste management agencies responsible should often not attend to little or on cohesive management methods considering the available information and its adequacy styles of management, management methods, and its related techniques. Considering the planning, operations, monitoring steps followed for solid waste management may differ in terms of organisations, managers responsible for solid waste management. Therefore, there is the need to consider all the essential management functions to articulate and discharge the relevant duties the process of managing solid waste.

2.2.2 Solid Waste Management Classifications

Solid waste are classified according to their physical, material structure, as well as risk level accompanying waste substances (World Bank, 1999). Literature suggests that Wastes (solid, liquid or air) are classified into types with respect to their sources. This classification (Table 2.1), therefore, influences the development of appropriate waste management tools and practices for urban and rural areas worldwide. With regards to the solid waste source-classification, that hinges on the nature of waste fact that waste originate from miscellaneous subdivisions of society, community and other urban sectors (residential, commercial and industrial).



Table 2.1: Criteria for Waste Classification

Criteria	Examples of waste types
Sources/grounds of generation	Residential commercial industrial, agricultural municipal services, etc.
Physical state of waste material	Liquid solid gaseous radioactive
Material Waste Composition	Organic food paper plastic glass metal textile waste
Risk Levels	Hazardous and non-hazardous

Source: World Bank, 1999.

World Bank (1999) had a respectable example on the waste classification in according to the study conducted in Asia, it was known that the sources of waste were; residential commercial, industrial, community, construction/demolition, and other agricultural sources (Wiafe, 2014). The categorization of waste categorized according to their physical state (liquid, solid, gaseous and radioactive waste). On the other hand, Waste, inevitable anthropogenic activity outcomes could be classified or sorted grounded on the risk level associated with living and non-living things, which are hazardous or non-hazardous to the existence of mankind.

2.2.3 Solid Waste Generation

The waste generation in the developing regions is on the ascendancy because there is increasingly growth in urbanization and industrialization worldwide (Owusu-Sekyere, 2013). Hence, population growth and urbanization in the global south has its attendant waste generation. There are also increasing industrial waste generation rate to serve



the growing population (UNEP, 2009). In many areas like the middle income, low income and high-class residential areas, the amount of waste generated is dependent on the population of people residing in the area. However, in most high-income areas waste generated surpass the lower- and middle-income areas. The organic content of the waste generated has a high organic content. Hence in many high-income areas, plastic and metallic containers form greater part of the waste generated by the people in high income areas (Boadi and Kuitunen, 2004).

Specifically, solid waste generated in low-income areas is relatively low compared to the high-income areas at 0.40 kg per capita daily. For middle income areas in many growing areas, the per capita waste generated stands at 0.62 kg daily (Kramer et al., 1994). It was also reported that the waste generated in low-income areas, has a high density of 0.50 kg/l, obviously due to the high share of inert matter (sand and dust) and organic matter of the waste composition. The waste densities in middle and high-income areas fall tremendously below 50 percent of the figure in low-income areas; 0.24 and 0.21 kg/l, respectively. The bulk of the waste is generated in low-income areas, which make up over 80 percent of the total population in the city (Ministry of Works and Housing, 2001).

In the works of Erami et al. (2015), who characterised Municipal Solid Waste (MSW) in Mahabad Town in India, they found out that, one hundred and thirty tonnes was the daily waste generation. In all about 75 percent of such waste was purchasable waste and organic materials totalling to about 97.5 tonnes of the waste generated daily. This finding is in line with that of Kuitnen and Boadi (2004) that, most of the wastes generated in Accra, Ghana, are organic materials. Erami et al. (2015) attributed the high proportion of the purchasable materials to the lack of diversity in consumption and waste source reduction programs. Thus, cultural policies and programs can reduce



the amount of waste produced at the source. Hence in many waste management entities the source reduction of waste generated is the main priority to municipal waste public and private waste team. Others also embark on composting to be the main project to better manage solid waste.

Not often significantly public participation in Municipal Solid Waste Management (MSWM) is seen to be very weak in some major towns and cities, together with the services rendered to the urban area. It is therefore important to increase public participation by providing stakeholders workshops, in-service training and to enhanced public participation at large. This is why in many developed and developing countries there is a high consensus on the idea that the building of composting plant could create and expand many job opportunities and further reduce waste dumps.

2.2.4 Waste Storage

Waste produced in the homes are dynamic in nature and demands to be handed in a container till collection period happened at the right time. Solid waste storage should be done within a period of time that will help contain the quantity of waste that move onto the environment freely. On the other hand, in some situations storage of solid waste is not done in accordance with accepted standards and could have a very severe effect as a result of improper waste disposal (EPA, 2002). Taking into account the usual the quantity of solid waste generation there should be the provision of enough facilities in various households and communities for the collection and storage of generated waste. The use of containers is basically practiced by the local people because is cheap and less costly. Aside such advantages, it helps in the solid waste collection and transportation to the dump site much easier. Such storage materials



include polythene bags, sacks of all kind (propylene), and metal bins (Downmore et al., 2011).

It was revealed in the works of Oteng-Ababio (2011) that, in Accra Metropolitan Area, solid waste is generally stored in polythene bags, boxes, buckets, in both the low and middle-income places. However, there were standard high solid waste bins used in a high-income area. More so, it was revealed that in Kumasi, the displayed that though some middle-income residents claimed to be using standard receptacles, empirical studies disclosed that there is impoverished galvanized receptacles.

In a much earlier publication by Benneh et al. (1993), they posited that low-income households in Accra, Ghana, the materials used to store solid do not meet hygienic standards and often cause the spread of the waste and other diseases. About 42 percent of households in the metropolis stored waste in open containers. With respect to the high organic content, moisture levels, and the available temperatures helps in the decay of waste rapidly. This has increased the procreation of flies and many other dangerous organisms which their health status to risk. However, 65 percent of wealthy households stored their waste in closed containers, about 50 percent of median income households, and only 32 percent of poor households stored waste in closed containers.

Indoor storage of waste is common among households irrespective of wealth, with only 32 percent of households storing wastes outside the home (Benneh et al., 1993). Martin (2011) also stated that the use of unapproved storage facilities and the concept of children in waste disposal, especially in the low-income areas present its own problems. This is because, in most cases, children find it difficult to properly access the containers due to their height. It thus becomes more convenient for them to throw



waste on the ground. Storage of solid waste appropriately is one of the major steps of handling solid waste within our communities.

2.2.5 Waste Sorting

Sorting of waste before final disposal helps Municipal Waste collectors to easily classify the different types of waste, identify the waste that can be reused and recycled, and then dispose of the unwanted material with the appropriate waste management technique. Sorting and separation of Municipal Solid Waste are gaining importance in various sectors. According to Henry et al. (2005), with the increasing cost of raw materials, recycling provides a cheaper source of raw materials for manufacturing industries. However, in Ghana, waste sorting is hardly done by households or Municipal Waste collectors due to haphazard generation and disposing of solid and liquid waste. The survey by Abagale et al. (2012), established that solid waste sorting is not being practiced in the Tamale Metropolis and the knowledge level is low. Sorting is only done by waste scavengers who are interested in the economic value of some waste material.



2.2.6 Solid Waste Collection

Throughout sub-Saharan Africa, the generation of solid waste is beyond the capacity of collection. This happens as a result of rapid population growth in cities: since the greater population of the people in the Africa lives in urban areas, about 35% of the true urban population increased more than 140 percent between the 1990 (EGSSAA, 2009). With reference to Anomanyo (2004), in Accra, solid waste collection is based on contract and franchise. As a result of poor documentation and expansion of cities, the estimation of percentages collected and the volumes of solid waste generated, is

unknown. Whereas Amoah and Kosoe (2014) identified two wastes collection services in Wa, Ghana. That is House-to-House (HtH) and Communal Container Collection (CCC). HtH waste collection was found to be implemented in middle and high income, low-density suburbs of the Township with well-planned settlements and infrastructure, whilst the communal container collection (CCC) which was implemented in low-income, high-density haphazard suburbs where infrastructural facilities are in a bad state and in some cases none existent. This, however, increased the spread of waste of all kinds in the Township and the frequent spread of bad odour and, some communicable diseases.

2.2.7 Waste Disposal

Waste is disposed of with waste disposal facilities such as, skips and dustbins, however this equipment is in short supply since Municipal authorities do not provide enough for the populace and as such households which cannot afford to purchase and pay for the service of Municipal waste collectors often resort to the use of the pit system where garbage is burnt in open fire which releases toxic fumes and noxious gases into the environment. There is therefore low collection coverage coupled with irregular collection services which are the result of limited waste collection facilities.

2.3 Sources and Types of Municipal Solid Waste

The identification of major sources of waste classification employed include; municipal sources, commerce and industry, urban agricultural sources, demolition and constructional activities, dredged spoils, sewage sludge, and mining and quarrying operations (UK Environment Council, 2000; World Bank, 2002). This classification of waste outlines the relative contributions of the different sectors of the



urban economy with regards to the waste types generated (see Table 2.2), planning for their collection and disposal in populated areas. The composition of the waste generated used to categorize wastes into types thus organic waste, paper and cardboard, plastic, glass, ceramics, textiles metal and inert waste.

Table 2.2: Solid waste sources, generators and types

Source	Typical waste generators	Types of solid waste
Residential	Single/multiple family household dwellings	Food waste, papers, cardboard, plastic, textiles, glass, metals, ashes, social waste (bulky items, consumer electronics, household hazardous waste, etc.
Commercial	Stores, hotels, restaurants, markets, offices, Guest Houses, Gas stations.	Food waste, papers, cardboard, plastic, glass, metals, ashes, social waste (bulky items, consumer electronics), office hazardous waste, etc.
Institutional	Schools, government centers, hospitals, prisons, and Non-governmental organizations, etc.	Papers, cardboard, plastic, glass, metals, ashes, special waste (bulky items, consumer electronics, office hazardous waste, etc.).
Municipal sources	Street cleanings, landscaping, parks, beaches, recreational centers.	Street sweepings, landscape and tree trimmings, general waste from parks, beaches and other recreational centers
Construction and demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete dirt.
Process (manufacturing)	Heavy and light manufacturing, refinery, chemical plants, power plant, mineral extraction, and processing.	Industrial process water, scrap materials, clay, tailings
Agriculture	Crops, orchards, vineyards, diaries, feedlots, farms.	Spoilt food waste, agricultural waste, hazardous waste

Source: World Bank/IBRD, 1999.

2.4 Emergence of Privatization of Municipal Solid Waste (MSW) Management

In recent decades, a policy of privatization has been implemented all over the world.

Formally, private sector is here to fathom to refer to corporation of private sectors,



institutions, firms and individual operating registered and/or associated businesses with official business licences, well grouped labour force controlled and directed by labour laws, Some level of capital investment, and generally latest technology (Furedy, 1991). All the characteristic definition of formal private sector is to derive massive returns on investments which serves as their main objective.

In recent decades, the issue of privatization has been instigated and allowed as a policy tool which aimed at helping the public sector to manage the affairs of most regions of the world specifically in developing regions. In some jurisdictions where communal ownership of firms was uncommon, such as North America and some countries in the sub-Sahara Africa, privatization has been viewed as the way to go, for instance the services previously rendered by the public sector are now given to the private sector or the private sector becoming co-partner in helping to solve the problems facing them. As rooted in history, privatizations commenced from Chile (the 1970s-early1980s) and United Kingdom1980s-early 1990s (Bel and Warner, 2008). Others trace the concept from the UK in 1953 where there was a denationalization of the steel industry while a fractional sale of state-owned enterprises in Germany (late1950s-early1960s) was considered to be the initial large-scale privatization program in Germany (Okamuro, 2004).

The great depression in the 1930s offered a platform for the privatization to be engaged in many parts of the world where responsibilities could not be left alone in the hands of the public sector. The delivery of the public services is conventionally the concerned of the public sector in many developing countries of the world. Inefficiencies in the public sector of developing countries compel the use of markets for public service delivery due to the increasing financial burden on the local governments. This makes it difficult for the government to manage waste in urban



areas for a reason that payment for work done is affected and then charges cannot be increased or placed on. This is why many countries including Ghana have employed the services of the private sector in the management of waste.

The engagement in solid waste management in private agencies is higher in terms of efficiency for the fact that the upkeep of their equipment is excellent and they are not deprived from bureaucratic hurdles. Vehicles and equipment are in good condition which ensures free operation and eventually ends up in higher output and profitability. According to Boorsman (1994), private sector has been well-equipped with qualities of economic rationality to operate, dynamism, innovative, political independence, efficiency; unique quality which seed their activities and operations above many public sectors in many economies. The rationales of embracing private sector participation is basically of the reason that the private sector works more efficient to the public sector; in conclusion, where there is no natural monopoly economic benefit will arise from privatizing public sector (Prasad,1998).

Other essential facet of engaging the private sector in low- and Middle-Income Countries (LMIC) is the issue of debt. The existence of most LMIC public budgets is as a result of external financial aid. In terms of the preparation and support of privatization programmes, the Britten Woods are the leading institutions of it and also providing advice and loans to cover costs associated with privatization and also providing investment loans to cover costs associated with privatization as well as ones to help restructure private enterprises.

Privatization is covers a body conditionality of the community given the donor (Grimshaw and Willmott, 2002). About 90% of investments in LMIC today come from external aid, taking into consideration (World Bank, 1997). With regards to LMIC, privatization is becoming unavoidable. In practice, communities given the



donor constantly engages the principles of privatization to provide services that better manage solid waste. This is a state of condition dependent on external aid sources. Hence one could conclude that efficient solid waste management and privatization are connected to LMIC.

The public sector has traditionally been carrying out the delivery of public services. Further in developing regions inefficiency in the public sector necessitates the adoption of various markets technique for public services and delivery resulting of increasing financial burden on the local government. Nevertheless, externalities and information asymmetry has been an object of disturbances in the market considering the perfect competitive nature and the willingness of the buyers and sellers to work in the public offices. If people are excluded from the service of waste collection (solid) as a public good, it is more likely for its negative impact to reflect on the environment. This is because in a market without regulations, solid waste cannot be controlled. Due to the market and government failures of solid waste collection, the private sector has been involved. As a result of over reliance on donor support costs, there is an also non-governmental organization failure. Therefore, there is the need for the updated public policies and financial backing and a support from government to give rise to the private sector to work all out and better manage developing countries waste.

As still an emerging issue as it is, the private sector involvement and investment in the management of solid waste, must embraces the extension of the market instruments of the Novel Public Management (NPM) in developing countries. It is however very difficult for the private sector to be contracting solid waste services in developing countries. Accounting for the development of NPM and decentralization of public service delivery of local service local government which covers; water supply,



sanitation and solid waste management services has been failed. This is because the significant improvement on the expected delivery of their services has often not achieved (van Dijk, 2006). Clearly, only service delivery was not enough to convey improvement as decentralization is concern and for that matter of private sector engagement in public spaces as incorporated in the constitution of many developing countries currently.

In the past two decades, the provision of the public sector paradigm began to shift. Various governments in a way has dynamically promoted the legitimacy of the private sector to help in the management of solid waste efficiently and effectively (Cointreau-Levine and Coad, 2000; Batley and Larbi, 2004). However, there is an issue of private sector ineffectiveness due to financial constraints and a low-level expertise in the solid waste management systems in many developing countries. On the other hand, several kinds of the private sector involve men have been suggested to be achieving greater efficiency and effectiveness in developing countries. This has helped the government to increase her chances of better managing solid waste in all her jurisdiction to defeat increase direct service delivery to many labours (Cointreau-Levine and Coad, 2000; Post et al., 2003).

In 1970s, solid waste management by the private sector through the collection, sorting and dumping has been the other of the day in many developing countries. These practices have increased and subject solid waste as a resource in the many countries (Eggerth, 2005). For instance, the early adopters United State in 1994 started the introduction of the private sector in the solid waste management. Out of the ten thousand number, about 80% of the waste collected were sorted and deposited (Cointreau, 1994). Through this several economies have accepted the use of the



private sector to cushion the public in the management of solid waste from collection, land filling, recycling to resource recovery.

Many countries in sub-Sahara Africa particularly has had the engagement of the private sector in many areas of their developing economies, for instance in many Francophone countries there are the increase in the private sector management of solid waste (Li and Akintoye, 2003). Similarly, in the Latin America, many cities; Santiago, Buenos Aires, Sao Paulo and Caracas where over increasing population are inevitable, they adopted the practice of introducing the private sector in the management of solid waste. Such private sectors are mostly engaged in many developing regions under service contract negotiations.

In the late 1990s, the private sector participation in the management of solid waste started gaining grounds. This was supported by the World Bank when they advocated for the engagement of the private sector in the mid-90s. This has motivated development partners to strengthen their support to help the private sector financially in the participation of solid waste management. This is the reason why there is a resurgence in the number of solid waste companies in developing countries, and according to Owusu-Sekyere et al. (2014). However, the involvement of the private sector in the management of solid waste has not been felt in relation to better quality of their services and their coverage. This has been on the agenda of many urban waste writers because of policy, capacity regulation, legislation and investment risk.

2.5 Privatization Forms under Municipal Solid Waste Management (MSW)

Several forms of privatization existed in the management of solid waste are available in many countries worldwide. These includes, contracting out, franchise, leasing or concession and open Competition.



2.5.1 Contracting out

Since the year 2000 contracting out has been the pillar of solid waste management in developing countries. It is often regarded as the process by which government award contracts to the private sector to help in the management of solid waste within an urban area. Their activities include collection of waste, street sweeping of waste, collection container, transfer station operation, disposal site and fleet maintenance. These awarding of contracts is very competitive because it is made up different companies. The terms in the contract backed the government to pay the private sector for their services. The services of the private sector cover the economies of scale, technological simplicity and the cost of moderate investment (Dillinger, 1994). This makes the local firms feasible for engaging in such contracts of solid waste collection (Bartone, 1991).

Contracting out is less costly in terms of cost. In the United States, the two principal studies on costs (one covering 1378, and the other, 340) displayed contracting was 10 percent to 30 percent less costly as compared with those for a public monopoly (Dillinger, 1994). These studies did not except government's cost to monitor contractors, estimated to average roughly 25 percent of overall costs (government plus contractors) (Dillinger1994).

2.5.2 Open competition

Open competition covers the process by which government gives opportunities freely to qualified private organizations to focus on refuse collection and recycling as well as disposal services. This has backed the contractual agreement between individual households or organizations with waste management entities for refuse collection, recycling and dumping under competition. In the works of Cointreau-Levine (2000),



private firm must hold zonally monopoly because they are all allowed to be in competition for their good works to benefit the society.

2.5.3 Franchising

The government gives out an award of a finite-term zonal franchise to the sequestered entity for the act of managing solid waste service in terms of collection as propounded by Cointreau-Levine (2000). After the competitive qualification processes, the licence award is made up. Performance bond is deposited by the private sector and the government pays a certificate fee to cover the government's costs of monitoring. The private entity needs to recover its cost and profit in the form of directing charges to the consumer in the form of direct charges. This charge is given to those that they serve within their reach. Through this, there is the need for the government to provide tariff control measures on the charges given to the local consumer (Cointreau-Levine 2000). However, there is the need for the government to regulate and control prices rendered onto the citizenry for better helping them to manage their solid waste.

According to Dillinger (1990), Franchise is applicable to solid waste systems for the reason that, there are attainable benefits on the economies of services only when solid waste was collected on a limited zone. Considering the user charges, there is the need for the private sector to consider the billing before solid waste to motivate the generators to work with these waste collectors. This is more likely to be one of the reasons why most countries allow contracting to franchising in the process of allowing the private sector to complement in the management of solid waste (Dillinger, 1990).



2.5.4 Concessional leasing

This covers the process of government awarding projects to private firms through the setting up of facilities that utilizes resource owned by the government. These activities given to the waste management entities must cover solid waste collection, transfer, and dumping (Cointreau-Levine, 2000). Concessional may be viewed as a long-term agreement backed contract which allows the private firm to build mutual trust with the government. In many cases the private sector may maintain the ownership of the facility within a specified period of time in operation before it is given back or integrated into the public domain (Cointreau-Levine, 2000).

Solid waste, for profit-making purposes under concessions, government allows the private sector to utilize its resources, in the case of all concessions associated to solid waste are typically covers the construction long-term facilities that has the abilities to sort, treat, transfer, or dispose all solid waste within an area. Despite the sale of the concession product by the government, there is the need for the government to pay for service fee on the part of the cost of processing solid waste. This will help the private sector to take absolute control to all services associated with solid waste management in a growing area. As part of the guarantee control measures, the government provide the flow control measures the facility design to help in the management of waste. With a take and basis of work, there are also a guarantee of daily quantity of waste on which most concessions are hinged (Li and Akintoye, 2003). In the four types of privatization, it has been widely accepted that this is well recognized and used. On the contrary what might work in one constituency may differ from the other. Hence in every country has its activities and the waste management strategy and the agreement that has existed.



This is why it is often suggested that the private sector involvement in solid waste collection and management is due to market and government or public failures (van Dijk, 2006). This explains why various Governments began championing private sector services to improve service efficiency and effectiveness to help achieve the Sustainable Development goals (Batley and Larbi, 2004). Private Sector Involvement (PSI) in solid waste management in developed and developing countries emerged in the last three decades is incomparable (Eggerth, 2005). By 1994, it was rampant in the developed nations where there was a bit more than 10,000 private firms engaged in urban solid waste management collection service in the United States, where more than 80 percent of solid waste was collected by the private firms (Cointreau, 1994). In developing countries, however, Private Sector Involvement in many sectors has been sluggish in the Sub-Saharan African countries, irrespective of increasing Private Sector Involvement (PSI) (Li and Akintoye, 2003).

2.6 Advantages of Privatization/Private Sector Participation in Municipal Solid Waste (MSW) Management

In the works of Savas (2000), the utmost customary regarded rewards the private sector has over the public sector or government is its management styles and flexibility. The inclusion of the private sector in the management of affairs has a greater ease on the effectiveness on the performance and mobility for workers with good performance. In the works of Savas (2000), considering the LMIC, the private advocates that privatization has results in a competition for economic growth and better services, that help reduce national debt reduction, and adopting more Foreign Direct Investment. This reduces pressure on municipal budgets is as a result of privatization, which therefore provide much and more flexibility.



It is therefore considered as the process of reducing public deficit by beefing up short run revenues by the government. In relations to the economies of scale, Cointreau-Levine (2000) indicated that there is the need for the enhancement of the private sector works in solid waste management because they are accountable to the responsible customers and must be reactionary to the dissatisfaction. The competition between the private and the government sector could be controlled by the cost effectiveness. Through this a very good standard of operation could be achieved when the contractual agreement backing the private sector are monitored effectively (Cointreau-Levine, 2000). The private sector has further flexibility to hire qualified staff on paying them according to the performance, to terminate the employment of unsatisfactory workers.

For the private sector to maintain its service delivery is dependent on the resource availability and the intended action of the private sector. Despite the availability of the equipment being requisitioned for other purposes they can optimize the size of the workforce or their staff (Cointreau-Levine, 2000). This means that the sector is very much restricted to the administrative procedure and motivate them to be able to channel all their capacities into where they are needed most. In spite of this, there is an increment in municipal solid waste production which calls for urgent and vibrant arrangement that protect solid waste production and management (Cointreau-Levine 2000). This activity includes door to door collection, deposition at the landfilling site. However, there are some skills and knowledge within municipalities to manage such activities operations into new geographical areas or into new activities. This has further improved the waste management chain that is linked to the treatment and disposal.

2.7 Privatization of Municipal Solid Waste Management and Limitations

Beforehand, privatization is believed to have been the solution in many fields due to its implementation effectiveness and completeness. In the work of Kessides (2005), privatization is oversimplified and somehow disappointing because in many jurisdictions it has been prove not to be effective. As often useful as it is, there should be a very good municipal engagement to enhance public values and understanding of a possible collaboration and an uncontentious resolution to the expected problems that will make the work of the private sector very difficult (Kessides, 2005).

Furthermore, discussions on privatization policies have amounted largely to the little or more competing subjective evidence. This often shows that there disjointed subjective stories between the two groups of thought on the concepts of privatization in solid waste management. Therefore, the point is always on how privatization can be done in an optimally way that are in accordance with reach social goals through the growth of the enterprise. This will help them prevent market distortions by helping them to regulate their dialogue with the business sector.

Privatizing the public services must not be based on conceptual thoughts but it should be a serious merit emanating economically. In Africa and for that matter Ghana, economic reasons stand tall of the reasons why the privatization of solid waste management. As part of the pressures on the government in developing region, there are pressures on their budget to fund solid waste management and many of such attempt has not yielded most positive responses, corresponding to the advantages of the sector. Competition is the key underlying determinant in the private sector. Hence the degree of the competition is a determinant of the efficiency of the private sector to supply services.



2.8 Waste Management Strategies Employed by the Private Sector

2.8.1 Source reduction

Reduction at the source constitute all actions that reduces the toxicity level of solid waste generated before disposing to an incinerator or landfill and processing (Denison and Ruston, 1990). In line with Kreith (1994) the volume of toxicity existing in waste are reduced. This is warranted by reusable products and returnable of all bottles and containers. This is in line with the important of practicing source separation and source recovery in solid waste management. All these strategies has the ability to manage solid waste on earth. Therefore, what is regarded as waste in one setting is seen to be a resource in another areas. Hence, waste has no value to the depositor or the presser who deposit it always. Similarly, in many developed countries such as the Austria, Netherlands Denmark and others, the management of waste is promoted by instituting waste management systems the promulgate source reduction and educating their citizens to separate their domestic waste such as glass, paper, plastic categories to aid collection and processing of waste (Tsiboe and Marbel, 2004). Thereby source reduction is seen as the most important solid waste management package that is being championed globally.

2.8.2 Sanitary landfill

Confining solid waste covers sanitary landfill, compacting and covering the top soil. This help in the reclamation of land into valuable use by preventing the burning of garbage (Centre for Environment and Development, 2003). The ultimate waste disposal in solid waste management is the oldest prevalent form of waste disposal (Zerbock, 2003). This means that landfill is regarded as open and a perfect controlled refuse dump. It was viewed that the differences between dumps and landfill was the



nature of engineering and the planning associated to it. Many open dumps are featured with poor engineering measures, poor consideration of landfill management and its operation. Often than not such operations covers registration of users, “tipping fronts” controls or the compaction of all kinds of waste (Zerbock, 2003). In a sustainable waste management, nobody want landfill but everybody needs it (Kreith, 1994).

This is why in most waste management there are no combinations in techniques without landfill to it work. This therefore suggest that landfill is regarded to be efficient and efficient strategies of managing solid waste. Contrary, some waste is not recyclable, because some recyclable waste can get to the extent of losing its embedded values and hence could no longer be recovered. This means that there is the need to employ adequate technology and an advanced means of operating to protect human life and the environment. However, in contrast to the advantages opine in literature on sanitary landfill in the area of waste management, there are unmentioned disadvantages such as it costly to construct or maintain, pollution of groundwater thus leaching, and land acquisitions mostly in the cities. Most critical disadvantages were not mentioned such as gas recovery, composting, waste to energy recovery. This means that there is the need to reconsider recycling of waste generated.



2.8.3 Recycling

In the work of Momoh and Oladebeye (2010), recycling the veritable process of minimizing the quantity of solid waste generated from the household before it enters to the dump sites. This has the ability to provide raw materials to the industries. Recycling has been viewed as the best and effective means of managing solid waste in a growing area. However, in many developing countries this practice may not be cost-effective. USEPA (1999) has it that the recommended on the basis of recycling stand

to be one of the most cost-effective techniques of waste management. All the materials that would have been waste and further caused problems on the environment could otherwise change into a valuable resource. This further turns materials into valuable resources that could have been waste product on the environment. These means that natural resource conservation, energy conservation, pollution prevention are key outcomes of a good recycling.

In real terms a very good portion of solid waste thrown away contains valuable resources which includes metals, glass, and plastic. These raw materials can be recovered and further use a raw material in an industry that are needed (USEPA, 1999). Kreith (1994) has indicated that, the concept of recycling is the most widely accepted technique that are easy going with and a very good waste management tool. The act of practicing recycling means that raw materials could be separated from all waste products or waste generated in the growing area. Recycling serves as a finite source of resources and gives a direction of tapping unseen resources waste may contain. These usage of resources from solid waste indicates how important resources exist in recycling because it has the potency of saving finite resources and hence there is no need for tapping resources that has been kept for the unborn. It was revealed by Tsiboe and Marbel (2004) that in the United Kingdom, waste recycle is eleven percent emanate from the household, Italy and Spain had 3%, Netherlands 43%, Denmark 29%, and Austria 50%. Though, recycling has been widely accepted in modern times, the cost implication must not be forgotten for a very successful implementation of a project with embedded recycling activity. Even many developed countries struggle to embrace recycling as a waste management tool but it is still the best alternative management tool.



2.8.4 Composting

Composting covers all the processes of using microbes to disintegrate all the organic content of the waste sorted and transported to a dump site. Aerobic composting procedure highly convert the heterogeneous component of all organic waste materials into homogeneous that have the ability to alter it into humus (Centre for Environment and Development, 2003). The United Nation Environmental Program 2009 considered composting to be a biological breakdown of decomposable solid waste. This disintegration was predominantly under aerobic disintegration and a good and safe use for agricultural purposes. However, in a limited resource area, composting is seen to be the best fits of all management problems associated with solid waste in many developing region (UNEP, 2009). This is because composting has a broad range of situations that makes it suitable. Therefore, in the works of Zerbock (2003), composting is an approach of using a low-technology to manage solid waste. However, in developing countries the average municipal solid waste stream is over 50% organic materials. Soil texture improvement is the advantages that augment micro-nutrient deficiencies.

It also increases the moisture-holding capacity of the soil and helps in maintaining soil health. Moreover, it is an age-old established concept for recycling nutrients to the soil. It is simple and straightforward to adopt, for source separated MSW. It does not require large capital investment, compared to other waste treatment options. The technology is scaled neutral.

Composting is suitable for an organic biodegradable fraction of MSW, yard (or garden) waste/waste containing a high proportion of lignocelluloses materials, which do not readily degrade under anaerobic conditions, waste from the slaughterhouse and dairy waste. This method, however, is not very suitable for wastes that may be too wet



and during heavy rains open compost plants have to be stopped. Land required for open compost plants is relatively large. Also, issues of methane emission, odour, and flies from badly managed open compost plants remain. At the operational level, if waste segregation at source is not properly carried out there is a possibility of toxic material entering the stream of MSW? It is essential that compost produced be safe for application. Standardization of compost quality is, therefore, necessary.

2.8.5 Incineration

In 2003, the Centre for Environment and development according to the Centre for Environment outlined that incineration constitute an organized burning process of waste to gases in order to reduce it to a residue or non-combustible ingredients. The centre holds the view that during burning of the solid waste, the moisture in the waste vaporized and the combustible percentage gets oxidized into the atmosphere. Carbon dioxide, water vapour, ash, and non-combustible residue are at the end products of many incineration. According to Kreith (1994), incineration has the capacity to reduce the volume of solid waste minimally. It has the capacity to recover energy in the form of steam, heat and electricity. Incineration is often constrained with its high cost of operation and its relatively high degree of complexity needed to operate safely and economically and a reduced tendency to pollute the environment. Notwithstanding, literature has proposed several other waste management methodologies that is seen to be effective and close to the benefits of recycling.

2.9 Integrated Solid Waste Management

Considering the total amount of all effort being made by many governments in addressing solid waste management challenges, there are still unending problems to



be answered (UNEP, 2009). This is why the UNEP (2009) estimated that in many third world countries, about 50% to 60% of their budget on solid waste management in urban and developing areas. It was deduced that the diversion of turning waste into a valuable resource has the capability of generating further revenue to fund waste management in the municipality or in the growing area. This has been the backbone of Integrated Solid Waste management in many developing regions based reduce, reuse and recycle principles. Integrated Solid waste management system has been on the agenda on pilot basis and often accepted by many authorities worldwide.

Considering the recycling system available, appropriate segregation and recycling systems are very significant from landfills and converted into a resource (UNEP, 2009). Similarly, the Environmental Protection Agency (1999) in the United State indicated that there is the need for the state or local government to plan and implemented the Integrated Solid Waste management. This could be very helpful by considering a hierarchy of methods which covers reduced, recycle and incinerate/landfill.



2.10 Sustainable Municipal Solid Waste (MSW) Management

Sustainable management of solid waste is an integral part of sustainable development (WCED, 1987). Considering the set objective for sustainable development, the nature of solid waste management in many regions is highly viewed to be an approach that can help in protecting humanity and the natural environment. This is very important because it has the ability to minimize natural resource extraction through the practices of reuse and recycling of raw materials. This has the potency to curtail the environmental impact of solid waste generation and disposal to protect ecosystem services for the future and current generation (Millennium Assessment Report, 2005).

It is therefore justified that the best way to achieve sustainable solid waste is the reduced and recycled solid waste or the total amount of waste generated (Girling, 2005). Whereas solid waste generation is inevitable, there is the need to encourage the practices of recycling, reuse and its associated solid waste reduction. Whereas it is very difficult to prevent waste generation and the practices of re-use and recycling, there is the need to process waste for its embedded values to be realized in the form of energy and raw materials. Sustainable waste management has the ability to bridge the connection between the local/public authority and the private sector that manages together the solid waste generated in the growing areas (London Waste Action, 2007).

2.11 Challenges of Municipal Solid Waste (MSW) Management in Ghana

The problem of Solid Waste Management (SWM) is multidimensional and is best appreciated in the light of rapid urbanization in cities. In urban governance the management of solid waste is part of the municipal concerns to manage the environment of the area (UN-HABITAT, 2010). This is because the inability for the organizations to properly manage solid waste across developing regions becomes of a great concern in Africa, where rapid population growth has masterminded the total quantity of waste generated. In this direction, solid waste generated are not adequately managed because there is a lack of technical and financial resource of municipal authorities (Ogwueleka, 2009; Taiwo, 2011).

In many Ghanaian towns, waste generation rate is 0.47 kilogram per person daily, this add up to the 12,710 tons of waste generated every day taking into account the total population of the country. In the works Mensah and Larbi (2005), it was revealed only ten percent of waste generated are properly disposed. Hence, huge quantum of solid waste between 30% and 50% of waste generated by the people residing in the



municipal area are collected and disposed poorly and often dispersed in the streets (Hardoy et al, 2001; Pacione, 2005, cited in Douthett et al., 2017). This area of indiscriminate waste disposal creates a breeding grounds for disease-spreading insects that trigger serious series of diseases (Oteng-Ababio et al., 2013).

Urbanization and population growth are often the driver of poor sanitation in many developing areas especially Ghana. Where there is an increase in population pressure and poor infrastructure in many cities in Ghana, the environmental services are affected to work effectively in such economies (Songsore et al., 2005; Owusu-Sekyere, 2013). Such many factors have against the operations and better management of solid waste in Ghana (Ampofo et al., 2016). Among these factors are low technical capacity and poor planning and management of solid waste and the weak enforcement of environmental regulations (Mensah and Larbi, 2005, cited in Douthett et al., 2017). Further, the outcome of poor environmental sanitation relative to the disposal of solid waste in many developing countries threatens Sustainable Development Goals (SDGs) achievement that covers goal 3.

Ghana is bedevilled with the inadequacy of efficient systems to manage solid waste, particularly in cities and towns. Elsewhere, Fobil et al. (2010) also argued that the lack of well-thought management plan for solid waste collection and disposal in most developing countries is a major drawback for efficient management of solid waste in most developing countries. The expansion of urban and sub urban areas has caused a number of diseases that affects the environments that are air related and others being waterborne diseases (Songsore and McGranahan, 1993; Addaney and Oppong, 2015). Such diseases include, Malaria, diarrhoea, and acute upper respiratory infections which are appropriate due to poor-sanitation. This is why recent analysis suggest that there is an increased in reported cases of diseases associated to the indiscriminate





waste disposal (MLGRD, 2010). In Ghana for instance, Amoatey et al. (2006) concluded in their study in Accra that the collection methods and other management strategies has negatively influenced the spread of malaria and other disease that are minimal and correlated. One major challenge that bedevils waste collection and transportation in Wa has been the untimely collection of the communal waste containers whenever they are full and this has serious public health implications (Amoah and Kosoe, 2014). Many illnesses related to sanitation. The waste management situation has been poor in recent times and has led to a very high incidence of sanitation-related illness such as cholera, intestinal worms, and typhoid. Hence public health crises could be heightened upon recording increase in such illness (Achankeng, 2003; GHS, 2008; Osei, 2008). In Ghana, problems are encountered at all levels of waste management, particularly, collection, transportation, and disposal. Generally, existing public facilities, including sanitary facilities, are inadequate to serve the user population, and the sheer volume of municipal solid waste generated in the country's urban centres is overwhelming (Yooda et al., 2014). While existing waste disposal facilities are inadequate to deal with the quality and quantity of waste generated, more sophisticated systems are expensive and their maintenance requirements are high (Peter, 2002).

2.12 Private Sector Involvement in Municipal Solid Waste (MSW) Management in Ghana

Considering the involvement of the private sector, it was foreseen in the short to the medium term, local government will provide some basic services up to about 60%, with about 40% given to the private sector. The local government also required to peg tariffs at realistic and economically achievable levels. This will facilitate the

generation of funds to recover cost and cleared depreciation to improve capital investment. This contracts often given to the private sector indicates that there is a regulatory apparatus that aimed at improving the capability of the stakeholder involved in the management of solid waste (Awortwi, 2003). This help in the facilitation, regulation, and to monitor the private sector capacities of solid waste management services.

The waste collection service in the city is performed by the private sector under various agreements with the metropolitan assembly, as well as the use of communal bins provided by private contractors. However, according to Yoda et al. (2014), the services provided by the private sector were reported to be unsatisfactory. The Sustainable Development Goals provide a framework for assessing the relevance and importance of private sector participation in solid waste management in urban areas. The impact of private sector participation in solid waste management on these goals cannot be ignored, particularly with respect to Goal 6, which emphasizes ensuring the availability and sustainable management of water and sanitation for all.

The private contractors are profit-motivated, business entities who see a gap in service delivery, fill that niche and charge for their services. There were 15 registered contractors during the study who were involved in waste collection and transportation from households and transfer stations to the final disposal sites. Presently, the Accra Metropolitan Assembly (AMA) has fully privatized its refuse collection operations while the Ga District Assembly (GDA) provides limited services mainly to selected markets (Yoda et al., 2014).



2.13 Conceptual Framework

Notwithstanding the embedded relationship existing between the public and the private sector, the private sector over the years is proved to be integrated in the management of solid waste worldwide. In this conceptual structure the causal relationships have been explained. The conceptual framework (Figure 2.1) displays the connections of the components existing in the frame that identifies the goals and principles of solid waste management in the Municipal area. The adoption of the private sector to participate in certain activities has become a tool or strategy globally by most governments which has the potency of improving the living condition of mankind.

The Wa Municipal assembly in collaboration with the government of Ghana opted for privatization as an emerging strategy to manage the increasing solid waste generation in the township of Wa. Taking into account the Wa Municipal assembly functions and the quantity of waste generated in the township there is the need for the private sector to be fully involved in the management of solid waste management in the municipal area. Several key objectives that guides the operations of the private sector in the participation of solid waste need to uphold very tight. Principal actors concern in the municipal solid waste management shown in Figure 2.1 includes the national government, local government, private sector, and the community members who benefitted basically.



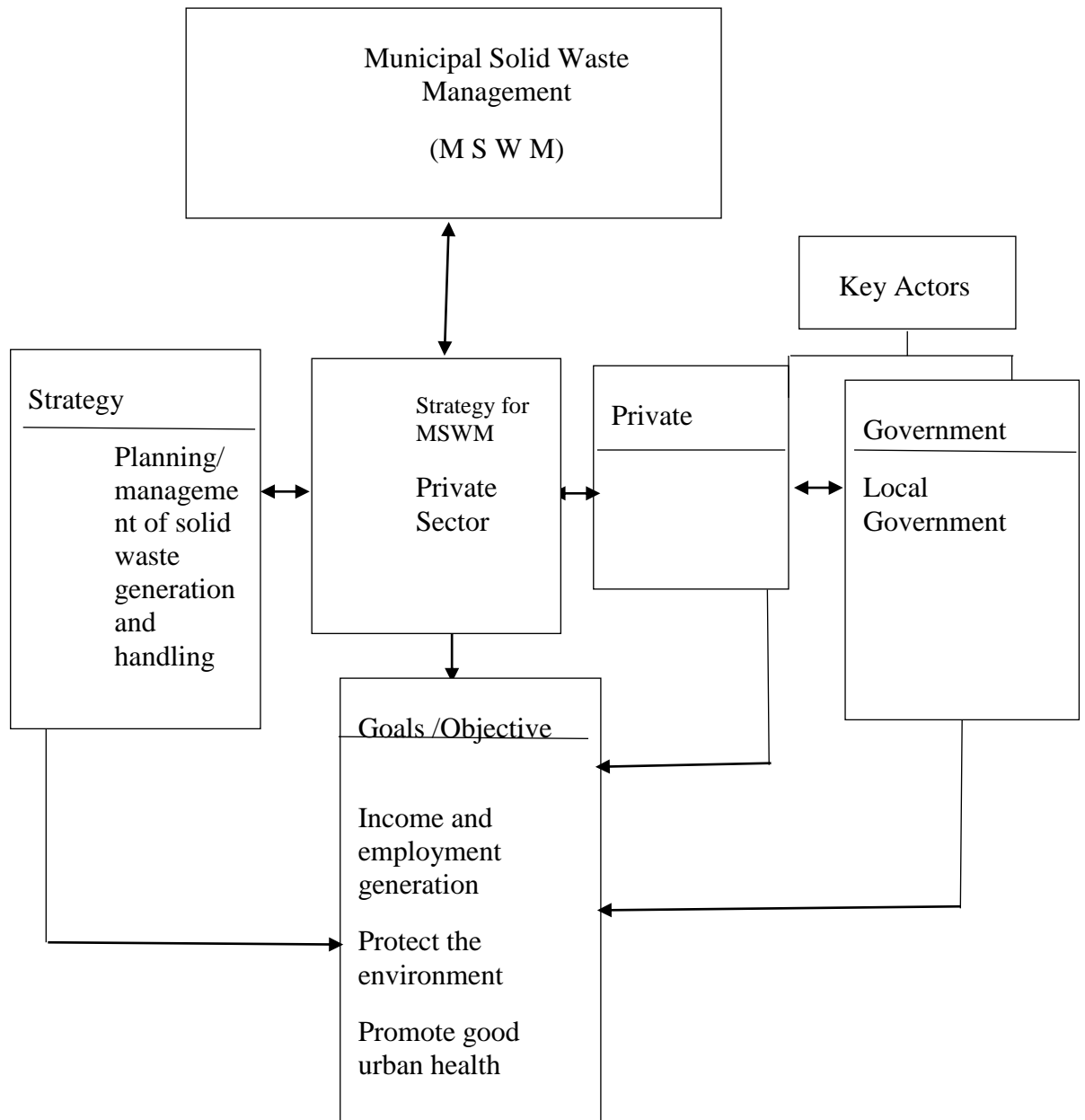


Figure 2.1: A Conceptual Framework

Source: Adapted from Schubeler, 1996.

As adapted from Schubeler's (1996) model, this schematic model was developed to underline as the basis of the study. This conceptual framework considers the main goals or objectives of MSWM, how to achieve them with its strategies and scope which includes actors in Municipal Solid Waste Management. The initial goal of the

Municipal solid waste management is to clean and adequately have a health protection of the population in the township. There are other key objectives such as; environmental quality and sustainability promotion, economic productivity support and employment generation in the wake of managing solid waste.

This also help in the management of the health echelons of the people in the corridors of the Township in the upper west region. There is a simple linear relationship between the goals of MSWM and the Wa Town as well as privatization. The model concern itself almost on the principal key actors of MSWM who are the National Governments, Local Government (Wa Municipal Assembly), Private Sector and the Household (Community members or Service users). However, the Planning and Management scope of solid waste managers in the Wa Township is connected to the National and Local Government at all levels.

This is because waste generation is linked to Users, Communities and the Households, who do the generation, whiles the Private Sector Enterprises is also connected to the Handling of the waste. After several efforts to manage solid waste in the Wa Town by the government through the Wa municipal assembly has been ineffective, the government through the WMA has adopted a very different strategy like other fast emerging cities in Ghana which inculcates the involvement of the private sector in solid waste management.

2.14 Chapter Summary

This chapter reviewed literature on private sector participation in solid waste management and discussed some basic concept related to solid waste management in the world, Africa and with special highlighting on Ghana. The chapter examined the historical antecedent of solid waste generation, management and the inculcation of the



private sector in Ghana was reviewed. The chapter also focused on the nature and reasons why there is the need of the private sector to participate in Solid waste management in the developing world. However, the established, governing and authorized frameworks guiding solid waste management in Ghana was reviewed.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter focuses on a brief background of the study area, and the methodological approach employed including methods used for data collection, analysis and presentation of the results.

3.2 Profile of the Study Area

3.2.1 Physical characteristics

Wa shares administrative boundaries with the Nadowli District to the north, Wa East District to the east and south-east and the Wa West District to the west and south-west. It lies within latitudes $1^{\circ}40'$ N to $2^{\circ}45'$ N and longitudes $9^{\circ}32'$ W to $10^{\circ}20'$ W as shown in Figure 3.1. Municipal Wa lies clearly in the savannah high plains with gently undulating and an average height between 160m and 300m with respect to the sea level. The most dominating Low-lying areas were found around these localities; Charia, Zingu, Kperisi to the north and Piisi, Dapouha, Boli, Sing, Biihe, and Busa to the south. Valleys in the low-lying areas collect and retain water over long periods during the rainy season and to some extent waste carried by winds which are very powerful in some regard. The streams are seasonal often mixed with dispersed waste and thus dry up during the long dry season thereby reducing available water for farming and other uses.



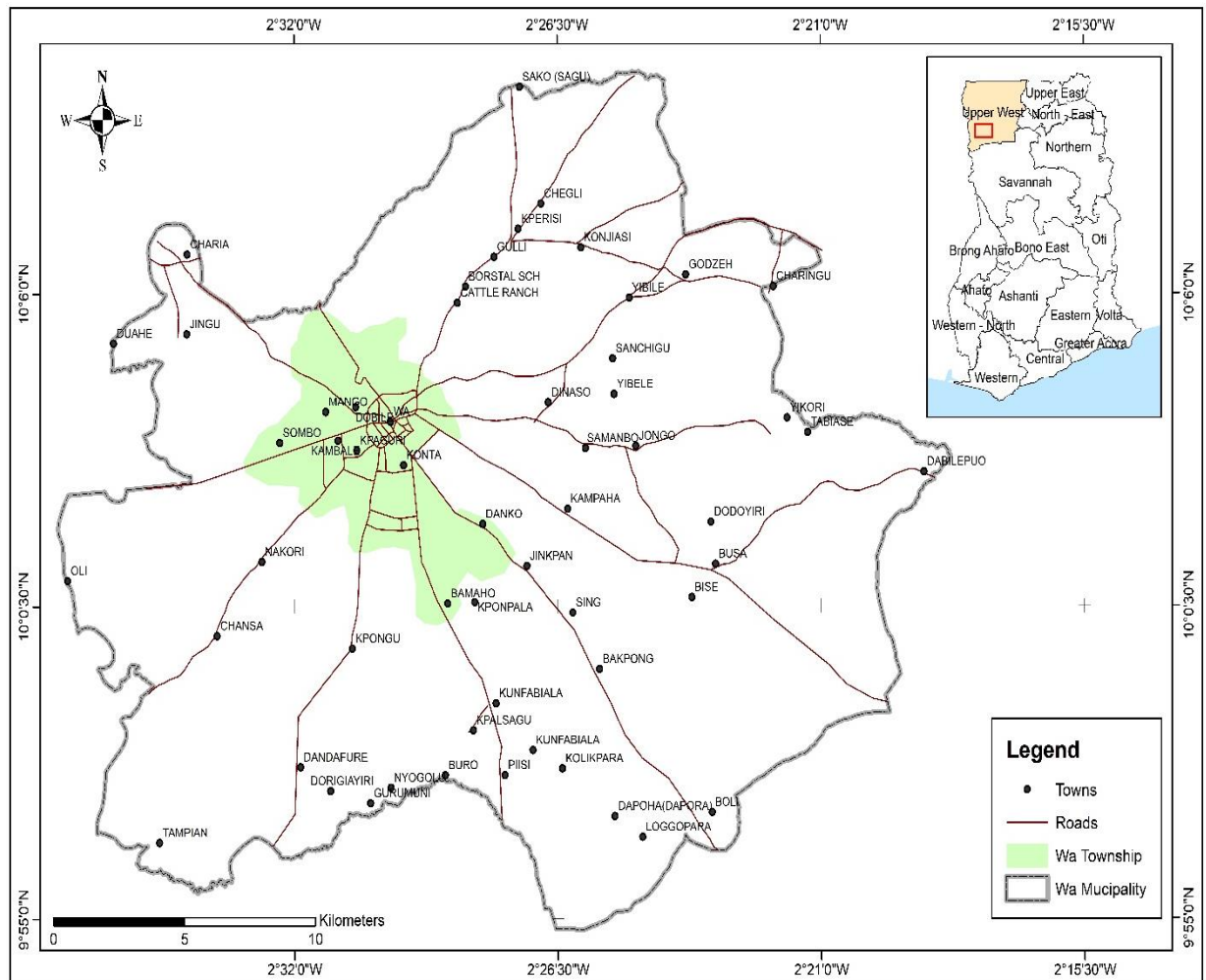


Figure 3.1: Map of study area

Source: Harmattan Geo-Spatial, 2019



Wa is the capital of the Town and also serves as the regional capital of the Upper West Region. It has a landmass area of approximately 234.74 square (kilo) meters, which is about 6.4% of the region with its waste generation as 4532 tons. According to PHC (GSS, 2012), Wa Township has a total population of 135,638 of which 2,996 are males and 54218 are females. Due to the intensity of population growth, urbanization trend and poor health of some sections at the core in Wa, waste generation is ostensibly evident with its increasing nature in tons.

3.2.2 Population structure

According to the 2000 Population and Housing Census (PHC), the Wa Town has a total population of 98,675. The Wa Township alone has a population size of 66,441. The growth rate of the Township varies between 2.7% for rural and 4% for the urban core which has impacted on the per capita waste generation in the township which influences its management. With such increasing population trends, in 2010, the total population of the Wa Town stood at 127,284 with males being 61,826 and a female population of 65,458. Currently, the total population of the Wa Town stands at 107,214 and forms majority of the 15.3% of the population of the entire Upper West Region of Ghana. The males constitute 49.74% while the females constitute 50.6% of the population of the Wa Town. The increasing population has its associated development implication in the areas of housing. Waste generation, waste management, environmental sanitation, and water supply, etc. (WMA, 2012; 2016).

3.2.3 Study communities, population and occupation

The study was conducted in six sections of the Wa Township according to clusters where issues of waste generation and its management is inevitably a problem. These clusters are; Lamayiri (Gyangbeyiri, Dondoli, Nayiri, Tampalipaani), Dokpong (Air Strip, Kumbiehi, Banungoma, Sawaba), Wapaani (Dobile, Fongu, Tagirayiri), Kabanye (Konta, SSNIT), Zongo (Sokpeyiri, Tendamba), Kambali (Kpaguri, Mangu, Upland/Xavier Residential area). These clusters were purposively selected because of the increasing waste generation as a result of population densification. The population of these clusters depend on the Wa Municipal Assembly for the provision of essential goods and services for their waste management challenges. This is because most of their primary activities are dominated in the core (Township) and ends up in the



internal market places of the Wa Town. The rest of the clusters are minimally populated with minimal waste generation. However, such areas have been used as dump sites which ends up widening the management challenges of waste in the Wa Town and hence the need for private sector participation.

3.2.4 Waste disposal

The wide method used for solid waste disposal in the Township is by the use of public dumps (container placed at vantage point). This account for 44.6 percent of households in the Township while there are some other traces of waste management in the clusters. The greater majority of the people in the Township proportioned to be 17.6 percent dump their solid waste indiscriminately causing severe waste management challenges in the Wa Town. House-to-house waste collection accounts for 4.3 percent of households which are often link to some class of residents in the Wa Town. On the other hand, liquid waste disposal also had majority challenges; this was because people in the Township (53.5%) threw waste onto the street and onto the compound.

3.3 Methodology

3.3.1 Research design

The study adopted a descriptive survey design. It was adopted because this study hinges on the principles of mix-method designs where quantitative and qualitative tools and techniques were used. This seeks to describe the nature of private sector participation in solid waste management. The study methods allowed for generalization of findings. Questionnaire, interview guide, observation checklist, and focus group discussions guide were used as tools for data collection. Thematic



analysis was merged in this study for the purpose of narrating or adding on to the deductions and answers received from the field. Institutional inputs were analysed in aphorisms which aided the comparative analysis of the result between the study clusters.

3.3.2 Sources of data

3.3.2.1 Primary data

Primary data were solicited through the use of questionnaires and the interview guides to gather firsthand information from the respondents. It is important to note that the combination of these sources allowed the researcher to have an adequate insight of the phenomenon under discussion. Primary data were principally about the nature of solid waste generated, the strategies put in place by the private sector to ensure solid waste management and the challenges facing the private sector in managing solid waste in the Wa Township.

3.3.2.2 Secondary data

Secondary data were collected from official records on waste management and sanitation from the offices Wa Municipal Assembly and ZoomLion/Urban Waste. These reports contained the catchment/operation areas of ZoomLion/Urban Waste, beneficiary households, scope of waste management in the Wa Township and related issues.

3.3.3 Target population

The study targeted all household heads who often take decisions for the family in terms of waste management in the township as well as landlords of various



households in the township. The study also dwells on other relevant stakeholders who make decisions on solid waste management in the township and the Wa Town at large. They include Urban Waste/Zoomlion Ghana Limited (Manager of Zoomlion or Urban Waste and Field Engineer), Wa Municipal Assembly (Environmental Sanitation Officer, Regional Director of Urban Waste), Environmental Protection Agency (EPA) Director, and Wa Municipal Health Directorate (Health Director).

3.3.4 Sampling

3.3.4.1 Sample size determination

Wa has a population of 71,341 (GSS, 2012), with six sections and subsections purposively used for this study for a fair representation of responses. The sampling unit was 66,441 households; hence the actual sample size selected from the unit was obtained through the formula by Adnan and Swaity (2015):

$$SS = \frac{Z^2 \times P \times (1-P)}{C^2}$$

Where, SS - sample size;

Z - Z -Value (eg.1.96 for 95% confidence interval)

P - Percentage of picking a choice expressed as a decimal (0.50 uses for sample size needed)

C - Maximum error of estimate (0.05)

$$\text{Thus, SS} = \frac{1.96^2 \times 0.50 \times (1-0.50)}{0.05^2} = 384.1$$



Therefore, the correction for the finite population for the study is described as

$$SS_{\text{new}} = \frac{SS}{1 + \frac{SS-1}{POP}} \rightarrow \frac{384.1}{1 + \frac{384.1-1}{71341}} = 382$$

Where, POP - Total population of the Wa Township is 71,341. Therefore, a sample size of 382 households was used in addition to 8 key informant interviews tallying the sample size to be 390 respondents. A proportional stratification was applied taking into consideration the total number of households in each cluster (see Table 3.1).

Table 3.1: Proportional distribution of household respondents

Area/Cluster	Number of households (PHC 2010)	Proportionate household Sample size
Lamayiri	3071	86
Dokpong	2 612	74
Wapaani	2016	57
Kabanye	876	25
Zongo	2567	72
Kambali	2475	69
Total	13,617	382

Source: Author's Field Work, 2019.



3.3.4.2 Sampling techniques

The researcher employed both probability and non-probability sampling for the study. Cluster sampling and simple random sampling were used in selecting study communities and respondents for quantitative study whereas purposive sampling was used for selecting respondents for qualitative data. These helped by giving the researcher a fair representation of the respondents in the study.

According to Gentles et al. (2015), purposive sampling technique is where the researcher selects rich information cases for in-depth study. These rich information cases are those great central important issues in the study. This sampling technique was used to select stakeholders including two officers each from the Health Directorate, Wa Municipal Assembly, and Urban Waste/ZoomLion Ghana Limited and the Environmental Protection Agency Directorate. These officials were purposively selected because they have requisite knowledge in solid waste management, especially in the Wa Township. These key stakeholders were selected based on those who have worked for at least three years.

At the community level, six clusters were purposively selected in the Wa Township.

This is because a baseline data from the Wa Municipal Waste Management Department had classified these areas as the worse discriminatory solid waste disposal in Wa Town. The selected areas generate more solid waste in the Wa Township. Purposive sampling technique was used to ensure that the clusters with similar characteristics in the township in terms of their location, and their distance from the landfill site and accessibility to the bin containers site in the township.

The researcher employed simple random sampling technique in selecting household respondents. The adoption of simple random sampling technique was very imperative since it gives equal chances to the respondents for being either selected or excluded as



noted by Kumekpor (2002), cited by Akantege (2018). In selecting the respondents, a list of all household heads in the study clusters was marked by the researcher for the purpose of the study. The researcher, therefore, used this list to select respondents. This was done through assigning random numbers with the use of a computer and in ascending order the expected number of household heads was selected. Situations where the household head was not present at the time of the research, the researcher skipped to the other household where there was a household head. This was because the household heads were spread in the population in each cluster. The choice of this technique was to ensure openness to the target group and also engage experienced people who take decisions on solid waste management in households to provide adequate information for the study.

3.3.5 Data collection techniques and instruments

To achieve the set goals, the study adopted several data collection techniques. These included interviews (structured key informant), participant observation and semi-structured interviews. These methods yielded detailed primary and secondary data which helped to achieve the objectives of the study.

3.3.5.1 Pre-testing of the instruments

This is the process by which a sample of questionnaires is administered on a trial basis before the actual work is carried out. This gave the researcher the opportunity to assess the effectiveness, accuracy as well as the actual time it takes to administer the questionnaires. This was done before the actual data collection. It took place in Bamahu, which was not part of the study clusters. The choice was because Bamahu appears to be one of the worse, as a result, solid waste management due to rapid



urbanization in Wa and the institution (U.D.S) that is located hence waste generation has been on the ascendancy with it management challenges which then calls for the need for private sector participation. The purpose of the pre-testing was to test the itemized questions on the instruments for irregularities, confusion, and effectiveness and ensured the validity and reliability of the instruments. The pre-testing also gave the researcher the opportunity to have insight into the issues that were discussed. Hence, inaccuracies in the pre-testing stage were corrected before the actual data was collected.

3.3.5.2 Questionnaires administration

Questionnaires were used in soliciting first-hand data from the household respondents. The respondents were household heads who take decisions on solid waste management in the home. These questionnaires included both closed and open-ended questions which covered the nature of the waste generated and the challenges which confront them in its management. The questions were put into five sections. The first section indicates the demographic characteristics of respondents and the remaining four sections discuss the issues in consonant with the research questions. This was issued to the respondents during the survey for them to willingly answer relevant key questions that aided the understanding of the work.

3.3.5.3 Interviews (semi-structured and key informant interviews)

Interviews (both the structured and key informant) were used to generate primary data from officials of ZoomLion/Urban Waste, Wa Municipal Assembly and the Environmental Health and Sanitation department and EPA. The key informant interviews were done by using an interview guide which gave the researcher the



chance to probe and get more information from the institutions, which aided convincing understanding of the study by indicating the trend of solid waste generation, types of waste generated, and the characteristics of waste in Wa. These stakeholders were two officials each from the; Health Directorate, Wa Municipal Assembly, Urban Waste/Zoomlion Ghana Limited, Environmental Health Sanitation and EPA. Key informant interviews were necessary since the study needed vital information on private sector participation on solid waste management in Wa.

3.3.5.4 Observation

The observation method was adopted on the field to gather primary data about types of solid waste, solid waste disposal practices, and management of solid waste in the Township. This helped the researcher to inculcate ground checks to confirm the questionnaire data on the dynamics concerning solid waste management and the urgent engagement with the private sector. This also helped to justify conclusions and recommendations to be a true reflection of what is on the ground. This proved very useful for the entire research process because observation technique was used in the preliminary studies. Through this, pictures were taken from the field to support the explanations and deductions that emanated from the data analysis.

3.3.5.5 Focus Group Discussions

Six separate focus group discussions were held; with one in each cluster selected, constituting women and men who were all household heads. Membership was drawn across households to deliberate on the challenges affecting solid waste management and why there is a need for private sector participation. This approach is considered appropriate when the object of the research is to explore reactions of a group or



cluster in response to some commonly experienced aspects of their environment with respect to solid waste management (Owusu-Sekyere et al., 2014). This added on to the information obtained from the questionnaire survey because not all the household heads had the chance to be part of the study but their contributions were key.

3.3.6 Data processing, analysis and presentation

The quantitative data was first edited and coded and it was checked properly to ensure that respondents have answered all the questions on the questionnaire. The data were then analysed using statistical software known as Statistical Package for Service Solution (SPSS version 20) where descriptive statistics was performed to generate percentages and frequencies and cross tabulations. The generated data was exported to excel for charts to be processed and this aided the pictorial understanding as well as guiding for a meaningful deduction from the data analysed. The same was used to summarize the information collected which helped to ascertain the exact findings from the study area. The data collected on the challenges was analysed using their Relative Importance Index (RII). The index is calculated in Adnan et al. (2007) as:

$$RII = \frac{4n_4 + 3n_3 + 2n_2 + n_1}{4(n_4 + n_3 + n_2 + n_1)}$$

Where: n_1 = number of respondents who answered —agree

n_2 = number of respondents who answered —strongly agree

n_3 = number of respondents who answered—Not sure

n_3 = number of respondents who answered —disagree

n_4 = number of respondents who answered —strongly disagree.



On the other hand qualitative data was analysed in themes and content where necessary. This allowed the researcher to corroborate or refute all information from the field gathered with questionnaires.

3.4 Ethical Considerations

Ethical concerns, according to Apusiga (2012), do not only border on confidentiality and anonymity but also the researcher's location and bias. Seeking and ensuring the consent and protection of information provided by the respondents are some of the ethics in research. The study took into account its rationale, objectives, and the purpose, which was truly explained to the respondents before reliable information was sought. The researcher assured the respondents that the information provided by them will be treated as separate from them and that the outcome of the study shall not in any way or at any time be connected or linked to them as a source of information leading to the findings and the outcome of the work.

3.5 Chapter Summary

This chapter looked at the research methodology that was employed in the study. In these regards, it deals specifically with areas such as the research design where the mix method approach was used for the study. The sampling techniques were also both probability and non-probability methods. This chapter looked at methods of data collection, sources and instruments and data analysis. It provides justification for the selection and a brief description of the study area.



CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents the analysis and discussion of the data obtained from the field. The chapter is sectioned into main themes reflecting the objectives of the study. The first section covers the examination of the nature of solid waste management, the second focused on the strategies put in place by the private sector to ensure solid waste management, further, the challenges facing the private sector in the management of solid waste and subsequently assessing the effectiveness of the private sector in solid waste management in Wa Township. The analysis also covered waste generation in the township, collection and disposal which call for private sector participation in solid waste management and the associated challenges facing private waste companies in Wa. The chapter, however, begins with a presentation of background characteristics of the respondents in order to understand their dynamics and also link their socio-demographic characteristics to the hook of the study.



4.2 Socio-Demographic Characteristics of Respondents

The background of respondents covered their marital status, sex categories, level of education, occupational characteristics and the number of people within a household as presented in Table 4.1. From the table, female populations dominated constituting 51%, and the remaining 49% were males. The reason was that most males were not interested in talking about solid waste and its management; they hence often referred the researcher to females in the household. It was also observed that male household heads were mostly on their farms, market places or sitting outside and chatting with friends and, therefore, not available at home to answer the questionnaires. In other

instances, male household heads had out-migrated in search for work leaving females to take charge of the household.

In terms of the age categories of the respondents, majority of them were within the working class that is between 18 years to 59 years. Between the ages of 18-35 years had 25%, 36-45 years had 40%, 46-59 had 26% and above 60 years had 9%. These age categories were adequately associated with waste and had much experience with regards to its management. In relation to the marital status of the respondent, it was revealed that 35% of them were married, 31% constituted singles, divorced and widow/widower had 11% and 16% respectively. This was very crucial to help determine the quantity of waste generated, its nature and management in the study area.

The educational level of respondents is also shown in Table 4.1. Percentage of the respondents who had acquired tertiary education is 29 which constituted the amalgamation of post graduate, first degree and higher national diploma. Majority of the respondents had basic education and constituted 31% while those who had no formal education had 28%. The level of education of respondents was crucial because it has a great impact on the local management structures of solid waste. This was what a respondent, who is a teacher, revealed:

“For me, I know how to manage my solid waste generated at home... it may not be right but burning and burying of sorted wastes on my compound has benefitted me and my family”.

The above statement was in line with the observations from the field. For instance, it was revealed that a number of the households visited did the open burning and burying systems and was due to the location and the distances between the residence and the waste containers designated for the areas in the township.



A chunk of the respondents were farmers and traders representing 54% and 31% respectively and other service professions had 15%. With respect to the household size, 15% of the households in Wa lived in houses with sizes ranging from 1-3. It was also revealed that 20% of the respondents belonged to households of 4-6 persons. Also, 26% of the respondent belonged in a household ranging from 7-10 people. It was however revealed that the majority of the respondent constituting 39% belonged to a household ranging from 11 to 20 people. This was persistent in the houses visited because a typical northern Ghana Muslim community, like Wa, believes in the extended family system, which is also in line with their religion.



Table4.1: Socio demographic characteristics of household respondents

Variable	Category	Frequency	Percentage
Age	18-35	98	25
	36-35	155	40
	46-59	99	26
	60years and above	30	9
Sex	Male	187	49
	Female	195	51
Marital Status	Single	120	31
	Married	134	35
	Divorced	41	11
	Widow/Widower	61	16
	Cohabiting	26	7
Educational level	Post Graduate	20	5
	First Degree	50	13
	Higher National Diploma	41	11
	Basic	120	31
	GCE O/A-Level	43	11
	None	108	28
Occupation	Farming	207	54
	Trader	117	31
	Other Service workers (Teachers, Nurses among others)	58	15
Household Size	1-3	58	15
	4-6	77	20
	7-10	98	26
	11-19	149	39
Total		382	100

Source; Author's Fieldwork, 2019



4.3 Factors that Influencing Solid Waste Management in Wa

The factors were looked at from several perspectives: those that influence the participation of the private companies/organisations in waste management, and those that influence the management of solid waste in the township. Again, these factors were considered both from the endogenous and exogenous dimensions. Information from key respondents from the private waste management company, the government institutions, and some private individuals identified the following as the major factors: Respondents were asked to indicate whether the factors identified in the table below had any influence on the participation of the private sector in solid waste management. The possible answers were Yes and No.

Table 4.2: Factors influencing Private Sector Participation in SWM

(N=182)

Factors influencing Participation	Frequency (HH respondents)	% of Respondents
Economies of scale and scope	270	70.6
Political interference	310	81.2
National policies on waste management	199	52.1
Resource endowment	205	53.7
Business orientation	298	78.0
Technical expertise	162	42.4
Public sector inefficiencies	286	74.9
Competition from public sector	76	19.9

Source: Author's Field Data, 2019.



It is evident from the table that household respondents considered political interference, business orientation of the private organisations and companies, public sector inefficiencies, and economies of scale and scope as factors that make the private sector have an edge over the public sector in waste management. Areas that household members did not see as having a major influence on private sector participation were technical expertise of the organisations and competition from the public sector departments and agencies responsible for waste management.

On the factors that influence the management of solid waste by the private sector, the under-mentioned were some of the key issues that came up.

4.3.1 Sources of solid waste generation

Sources of solid wastes have a great influence on their management. Table 4.2 depicts the major sources of solid waste in the Wa Township as obtained from official reports on waste management from ZoomLion/Urban Waste. Data revealed that 50% of all solid waste generated in the Wa Township was from residential areas while the Service sector generated the least amount (14%) of solid waste. As Tchobanoglous et al. (1993) would assert, the dynamic sources of solid wastes in Wa affect their management because the characteristics of the solid waste, collection, handling and transfer to dump sites have been affected by diversity of wastes generated. Also, the dynamic sources of solid waste in the township have impacted negatively on several management practices embarked by the government (Wa Municipal Assembly, 2012). The dynamic nature of sources of solid waste generation in Wa has further attracted diverse private managers to help clean the town. This was what a teacher had to say:



“I am very surprised about the authorities in the township and how they manage spaces” you walk around few meters what you may see are all sorts of domestic and commercial activities that generate a lot of solid waste which far outweigh the capacities of the Municipal Assembly to manage. The intervention of ZoomLion and its Urban Waste subsidiary has come at the right time.”

Table 4.3: Sources of solid waste generation

Sources	Percentage (%) share
Residential	50
Commercial	21
Agricultural	15
Services	14
Total	100

Source: Urban Waste/ZoomLion Waste Management Report, 2018

This means that apart from direct human produced wastes in the township, there are traces of solid wastes generated in the township by urban agricultural activities hence making the management of solid waste difficult by all stakeholders in the township. In accordance with literature, as cited in Wiafe (2014), the World Bank (1999) had unrepeatably waste classification of one of its study conducted in Asia which had their waste generated sources emanating from residential, commercial, industrial, services, agricultural sources and others. This was also revealed by a 42-year old market woman who said that:



“The number of wastes generated in the market and other commercialized activities were on the rise and far above the capacities of available waste managers in the township”.

This corroborated to the reasons for private sector participation in solid waste management in the Wa Township.

4.3.2 Types of solid waste generated at the household level

As shown in Figure 4.1, 50% of the respondents indicated that colossal part of the solid wastes generated at the household level are food wastes. The other 50% had mentioned the following dimensions; papers/cardboard waste (12%), plastic, glass and metal (16%), textile (17%) and consumer electronics (5%). Though majority of all these wastes emanated from homes or could end up in homes, their quantities pose serious danger to management in the township.



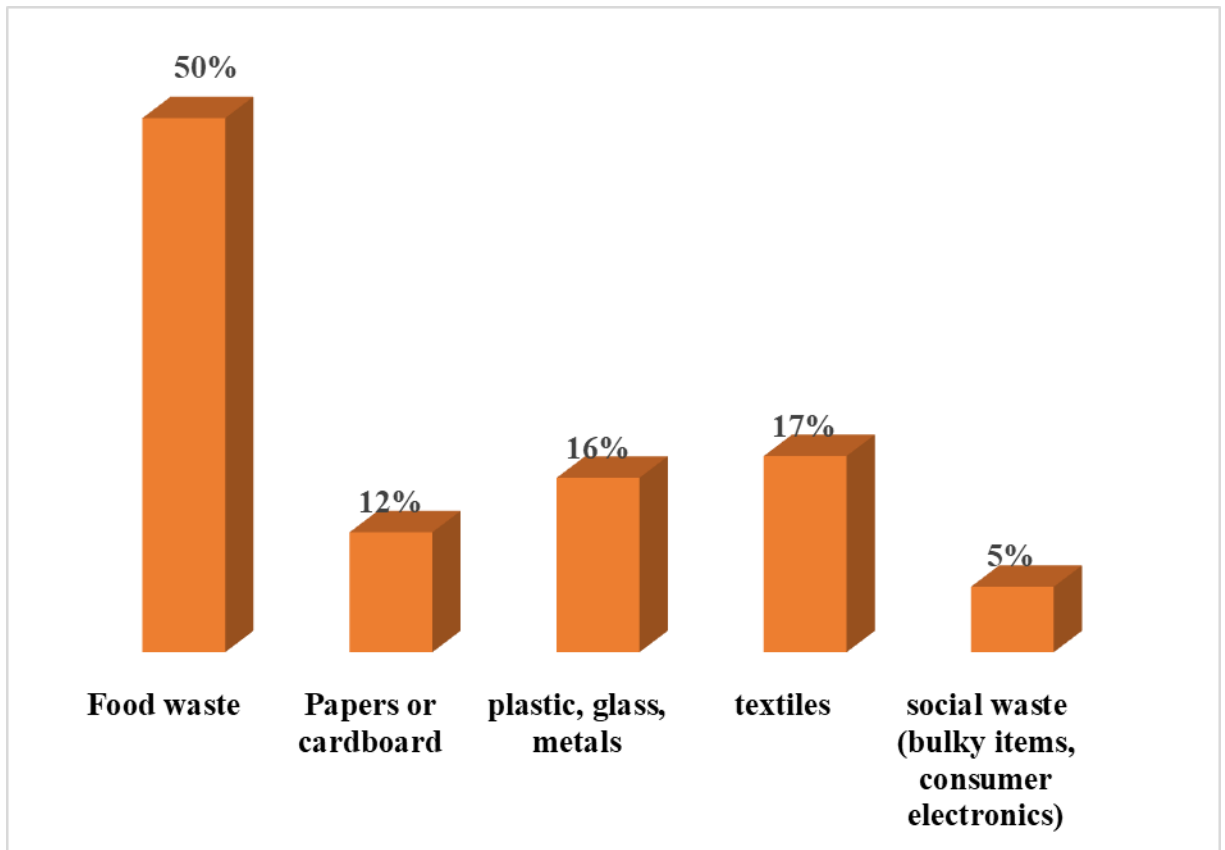


Figure 4.1: Household waste types generated

Source: Author's Fieldwork 2019

One of the household heads interviewed expressed his views on the types of solid waste generated in Wa:

“Indeed, we cannot deny the fact that we are the greatest contributors of solid waste in the township but much of our waste is very degradable in no time just that it may be disgusting with bad odour and where, how we dispose them is very unpleasant in the township”.

This means that, apart from food wastes, other solid waste types were generated by the households in some minimal quantities which affect its management in the township. Hence the study revealed that the material composition of solid wastes generated, that is organic wastes, had 71%, and the others (paper, plastic, glass, and



textiles) were 29%. Inevitably the nature of solid wastes generated in the township was dominated by food wastes or organic wastes which have greatly affected management.

4.3.3 Physical state of solid waste generated

Whereas greater majority of Solid wastes generated in Wa were solid, constituting 80%, the description from respondents and the reliance on secondary data from the Wa Municipal Assembly and Zoomlion Ghana Limited suggested that there are other forms of waste in the township which also need attention. It was revealed by the study that 6% of the total wastes in Wa was gaseous, 4% was radioactive waste and 10% was in the form of liquid (Figure 4.2). It was observed from the field that indeed the nature of solid wastes generated in the township had several unrelenting challenges which justify the need for the private sector to participate in waste management.



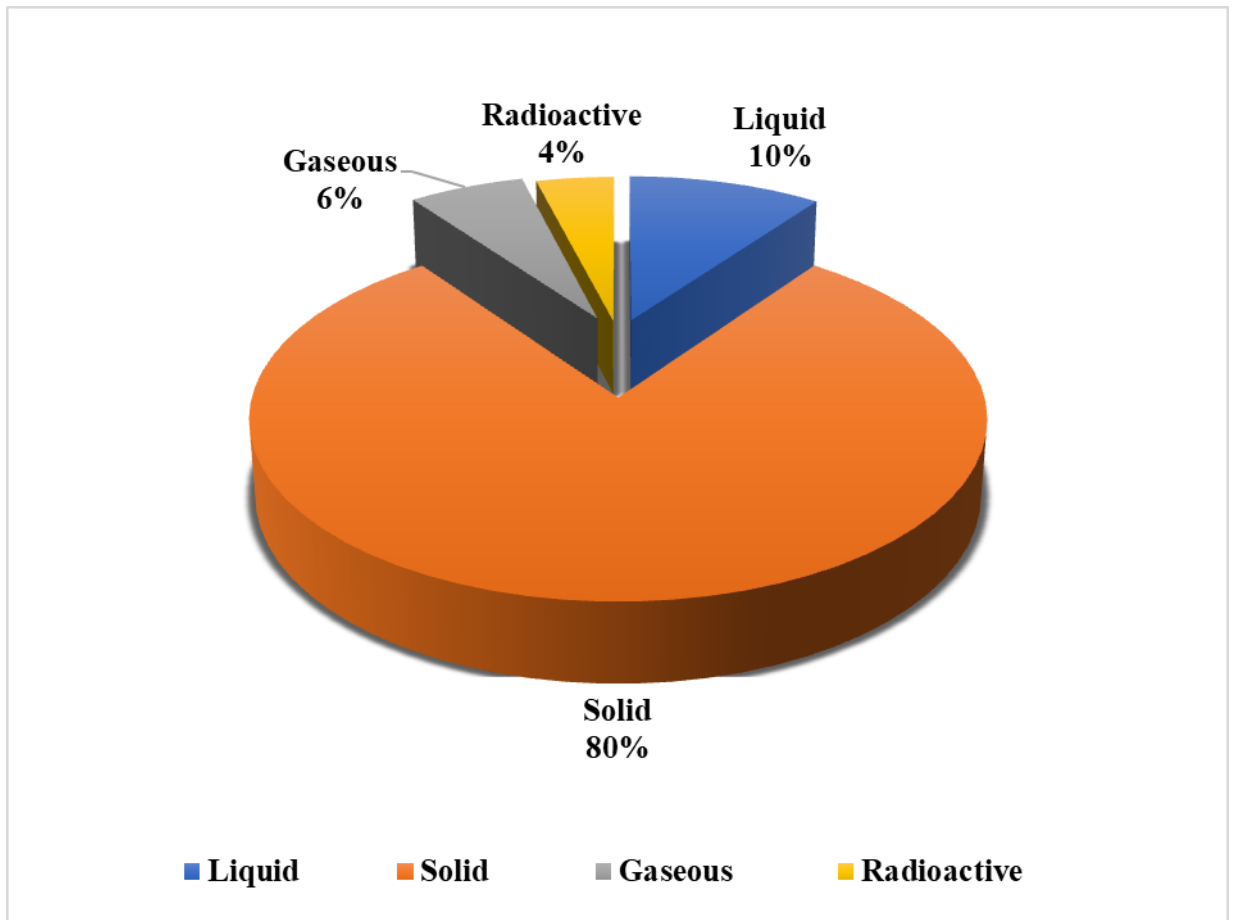


Figure 4.2: Physical state of wastes generated in Wa

Source: Author's Fieldwork 2019.



4.4 Management of Solid Wastes at the Household Level

The nature of solid waste generated at the household level has prompted the attention of assessing how it is managed - storing and final disposal. Forty-six percent (46%) of the respondents indicated that they store their waste in jute sacks, 15% stored solid wastes in old baskets, 11% use of broken plastic baskets while 28% stored their wastes in bins either privately acquired or publicly given by waste management operators in the township.

Table4.4: Home-based solid waste storage before dumping

Waste storage containers	Frequency	Percentage (%)
Jute sacks	176	46
Old baskets	57	15
Broken Plastic Buckets	42	11
Waste bin	107	28
Totals	382	100

Source: Author's Fieldwork 2019

A household respondent who was also waste truck driver indicated that:

“Majority of the households in the township use storage materials that were in bad condition, hence it does not render them to work with some approved waste managers in the township”.

For instance, if wastes are kept in a basket and other broken plastics (see Plate 4.1), it affects dumping and whiles the waste depositors are on their way to dumping sites, a lot of the wastes litter the environment. It was also observed during the survey in Wa that solid waste was mostly carried by children between the ages 9-15 years to the dump site who improperly dispose waste at designated sites or places. This has often worsened the poor management of solid wastes in the township because waste transportation, handling and deposition are far in the deplorable state in Wa.





Plate 4.1: Home-based solid waste storage containers

Source: Author's Fieldwork, 2019

The nature of waste generated, people who are engaged in handling and transporting to dumping sites have contributed to the management of this by-product at the household level severally. It was revealed that 46% of the respondents deposit their household wastes into bushes and other open spaces around their abode (Figure 4.3).

An appreciable percentage of the respondents, constituting 24%, were of the view that they managed their wastes by depositing them in uncompleted buildings. A few (13%) indicated that wastes are sent to communal waste collection points and the remaining (17%) unveiled that they do the open dumping systems.



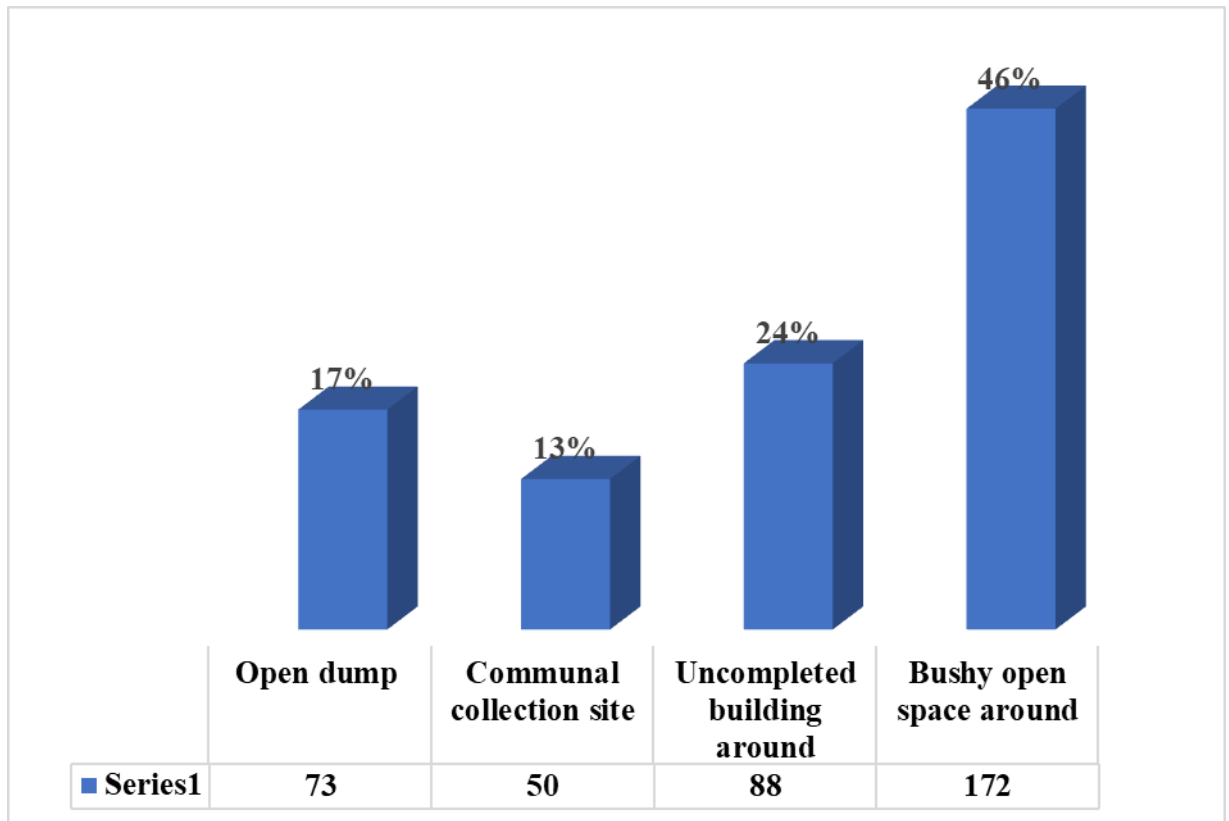


Figure 4.3: Household level solid waste disposal practices

Source: Author’s Fieldwork, 2019

This was what a 39-year household head had to say:



“The location of our communal dumping container from my house is very far often sending children also comes with numerous challenges which impact negatively on solid waste management in the township”.

This means that there is the need for waste managers in the township to prioritize the number of communal containers in an area. This will address issues of over-dumping and overflow of waste around designated container sites. For instance, Plate 4.2(a) indicates how depositors (often children) are unable to dump wastes into containers. In cases where waste management companies supply households with waste bins, their inability to empty them regularly often contributes to mismanagement of solid

wastes. For instance, Plate 4.2 (b) shows the overflowing waste bins in some service areas within the township.



Plate 4.2: Overflowing (a) open dumping container, and (b) private waste bins

Source: Author's Fieldwork, 2019.

4.4.1 Strategies Used by the Private Sector in Solid Waste Management in Wa

4.4.1.1 Stakeholders in solid waste management

Respondents identified the following (Figure 4.4) as some of the companies/institutions and individuals that are into management of solid waste in Wa: Zoomlion Company Limited and its affiliate Urban Waste Management Company in the township were adequately managing solid waste (53%); Wa Municipal Assembly (31%); private individuals (9%); and other entities springing up in the town, such as the 'motor kin' and wheel barrow cash and carry collections (7%).



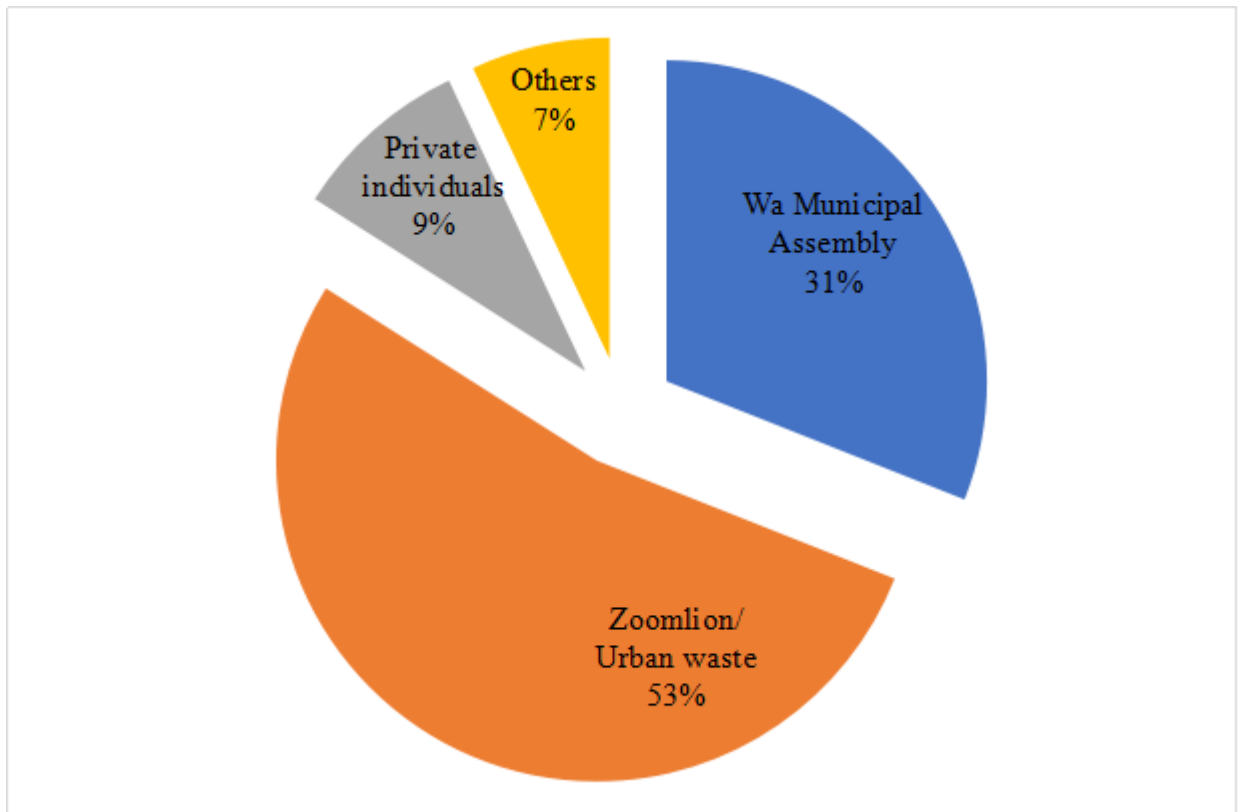


Figure 4.4: Stakeholders in solid waste management in Wa

Source: Author's Fieldwork, 2019

It is established in literature that, expected improvements in service delivery have often not been achieved although there has been decentralization in the sector of management of solid waste in many cities and towns (van Dijk, 2006). This corroborated the assertion of the Head of Waste Management Unit of Wa Municipal Assembly, who revealed that:

“There is collaboration between the private sector and the Wa Municipal Assembly in the management of solid waste in the town. Often at times, it is the private sector that works tirelessly to manage solid waste in the township with very limited activities performed by the Municipal Assembly”.

This means that the management of solid waste is basically in the hands of the private sector which encompasses the private waste management companies, individuals and



others. Solid waste management in Wa looks more of the public-private partnership but greater work is done by the private sector in terms of funding and creating funds to aid their operations. In the 1990s, governments of developing countries vigorously began to promote the private sector as provider of solid waste management services to improve service efficiency and effectiveness (Roth, 1987; Cointreau-Levine and Coad, 2000; Batley and Larbi, 2004).

4.4.1.2 Common practices

Respondents were quizzed on the various factors that could be used to assess the existence and operations of the private sector. This was what a trader had to say:

“The Urban Waste Company in Wa is trying very well for the township. I just saw their tricycle and workers sweeping and collecting the rubbish on the streets of Wa”.

This suggest that apart from the management of solid waste in the township, private waste managers, in partnership with the Wa Municipal Assembly, have recruited people who are monthly paid to sweep vantage points in the township (see Figure 4.5). Also, 81% of the respondents revealed that house-to-house collection has been one of the signs which justify to them that there is the existence of the private sector in the management of solid waste in the township. The remaining 19% were of the view that they have not felt what the private sector is doing in terms of house-to-house collection in the township. In the past, there were no such waste management companies in the township until the springing up of the private sector.



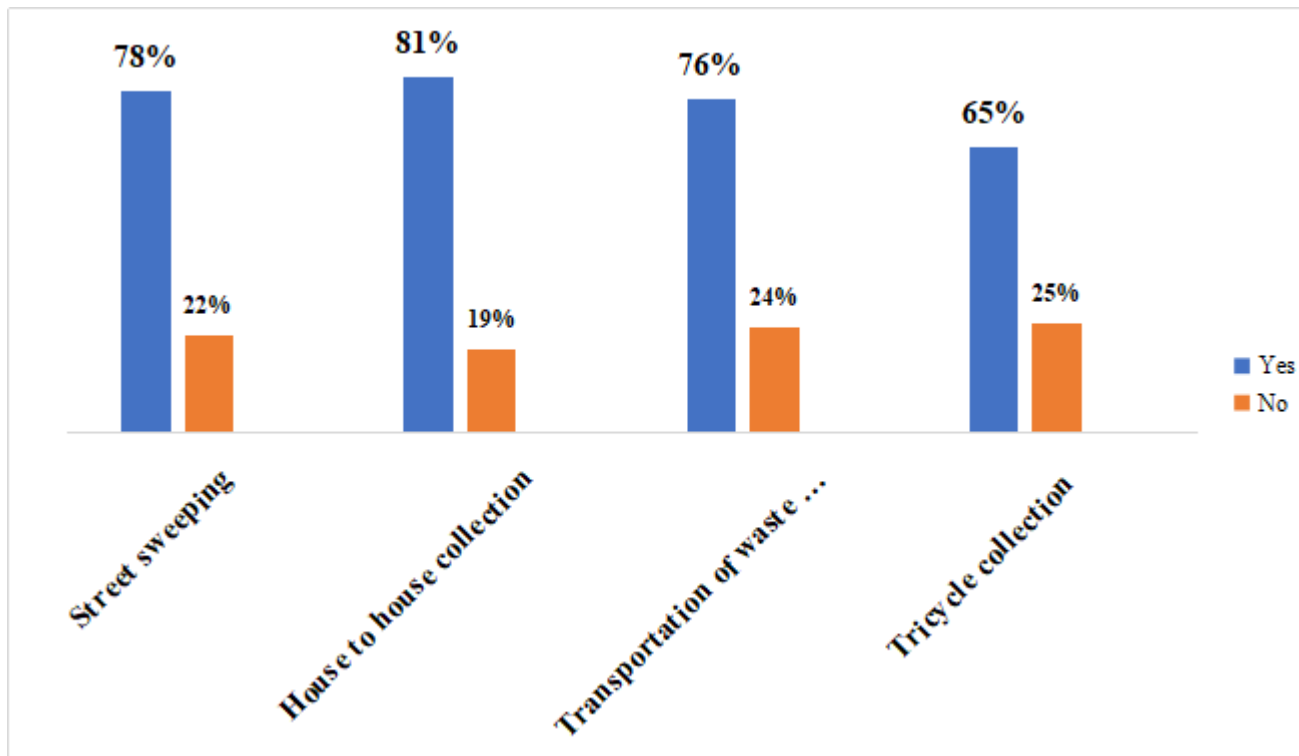


Figure 4.5: Practices of private sector waste management companies

Source: Author's Fieldwork 2019

This was what the Head of the Waste Management Unit of the Wa Municipal Assembly indicated:

“it is very refreshing to see many private organizations or individuals engaging in the waste management business in the township. This has fuelled the free distribution of waste containers and timely collection of wastes”.

This suggest that majority of households now have access to good bins and communal containers nearby that could persuade them not to employ poor measures in the management of solid waste in the township. Respondents further revealed that private waste managers have started educating them on waste sorting which will also attract payment. This sum up to the motivation packages apart from their traditional practices in waste management. For instance, a 52-year old waste worker hard this to say:



“It is very difficult to deal with solid waste in the township. It is always mixed with a lot of ‘other wastes’ which makes management through sorting very difficult for us ... that is one of the more reasons why the company is educating the public on waste sorting practices that may attract some payment”.

Also, greater portions (76%) of the respondents was of the view that private waste managers in the township transport waste containers filled with solid waste to the landfill site (see Plate 4.3). The remaining 24% of the respondents were of the view that they had no idea about such practices. Although, critics argue that they do not cover their tracks whiles transporting waste to the landfill site, the reality is that greater portions of waste dumped in the township are conveyed out to the landfill site to keep the township clean. Although, there are poor management practices in these organizations, there have been existing records of emptying designated waste containers in the township.



Plate 4.3: Waste truck picking communal waste containers

Source: Author’s Fieldwork, 2019

Plate 4.4 shows an emerging individual waste collection strategy (tricycle collection) in the township that is also helping in the management of solid waste in Wa. This private organization (urban waste and other private individuals) accesses every area in the township until the container is full. This is more efficient because the more waste is collected, the more money is accrued.



Plate4.4: Collection of waste bins at the house hold level

Source: Author's Fieldwork, 2019.

Respondents indicated that they have been motivated severally by private waste managers in the township to participate in waste management. It was revealed that 12% of the respondents were of the view that the private sector provides them with waste bins (Figure 4.6). They indicated that it has been very helpful for them to store their wastes for them to collect in a three day's interval to the landfill site with minimal cost. This was what one Director of Wa Urban Waste had to say:

“Clearly, it is free to give waste bins to those who want to work with us and has agreed to pay some token amount to us to maintain our infrastructures and to pay our staff”.



Also, 15% of the respondents indicated that waste sorting education has been on the agenda of private waste managers in the township. Further, the house-to-house (HtH) collection is typically akin to residential (higher and middle-income) areas in the township and other public institutions. With this system, house owners, caretakers or tenants, office buildings or spaces, and street-vending kiosks are registered with the Company to pay a fee, which is tied to the quantity of waste generated within a week. A field officer of the Company collects the solid waste in some days' interval at a fee between GHS 12.00 and GHS 25 per container in a month.

Further, 42% of the respondents contacted for the study indicated that the private sector provides them with communal containers at many vantage points in the township that helped aiding the residents to deposit their waste at the immediate point in the township. With respect to the communal waste containers (CWCs), the practice of communal container collection (CCC) is ideal. It was revealed by one field agent that they are going to roll out the pay as you dump system with the installation of container inspectors in most of the low-income areas in the township. He was of the view that:

“Those low-income areas generate relatively very high quantities of waste in tonnes with free dumping, in many public places such as markets, educational institutions and public hospitals”.



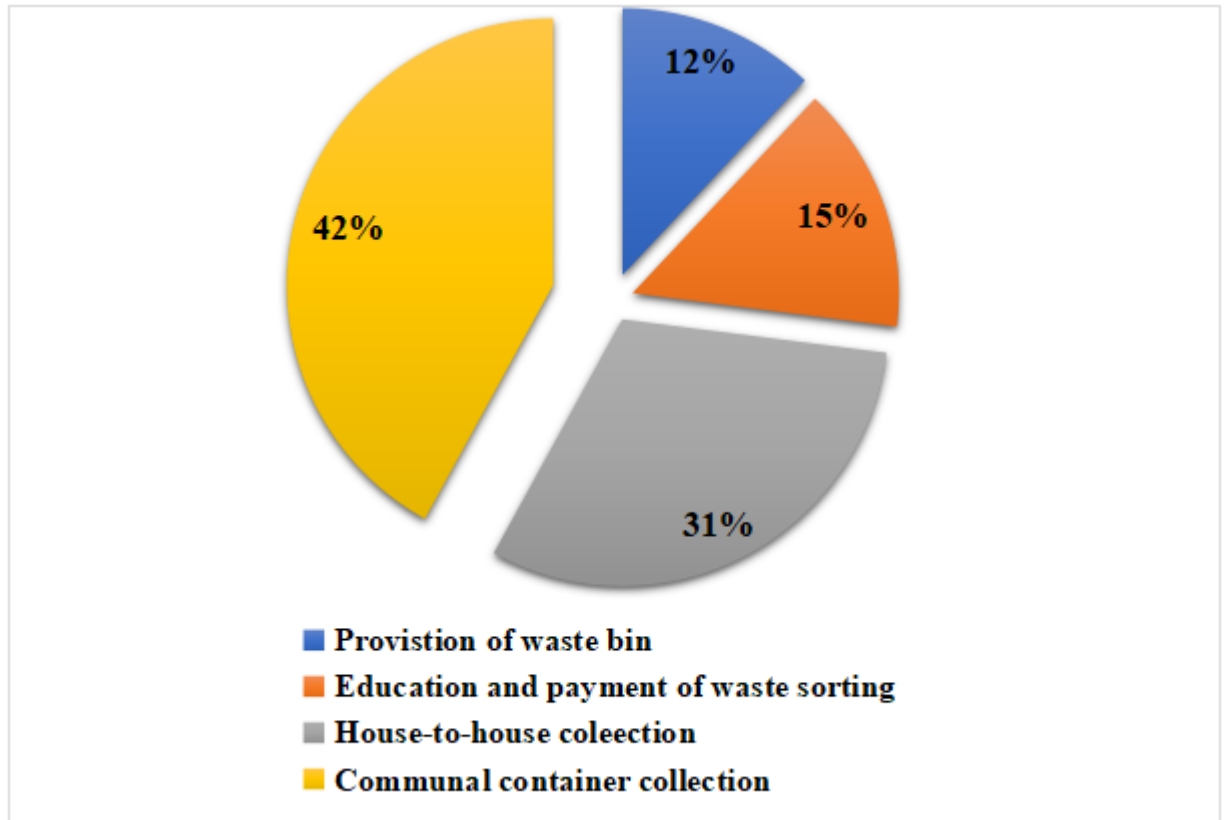


Figure 4.6: Private sector motivations in solid waste management

Source: Author's Fieldwork, 2019

4.5 Effectiveness of the Private Sector in Solid Waste Management in Wa

The study sought to ascertain the effectiveness of the private sector in waste management practices in the Wa Township. The study revealed two dominant strategies - communal waste container collection and house-to-house collection (Figure 4.7). It was revealed that 66% of the respondents had it that the use of communal waste container collection was effective whereas the remaining 34% had it that communal waste container use in solid waste collections was not effective. Also, majority (63%) of the respondents were of the view that embarking on house-to-house collection was not effective while the remaining 37% indicated that house-to-house collection was effective



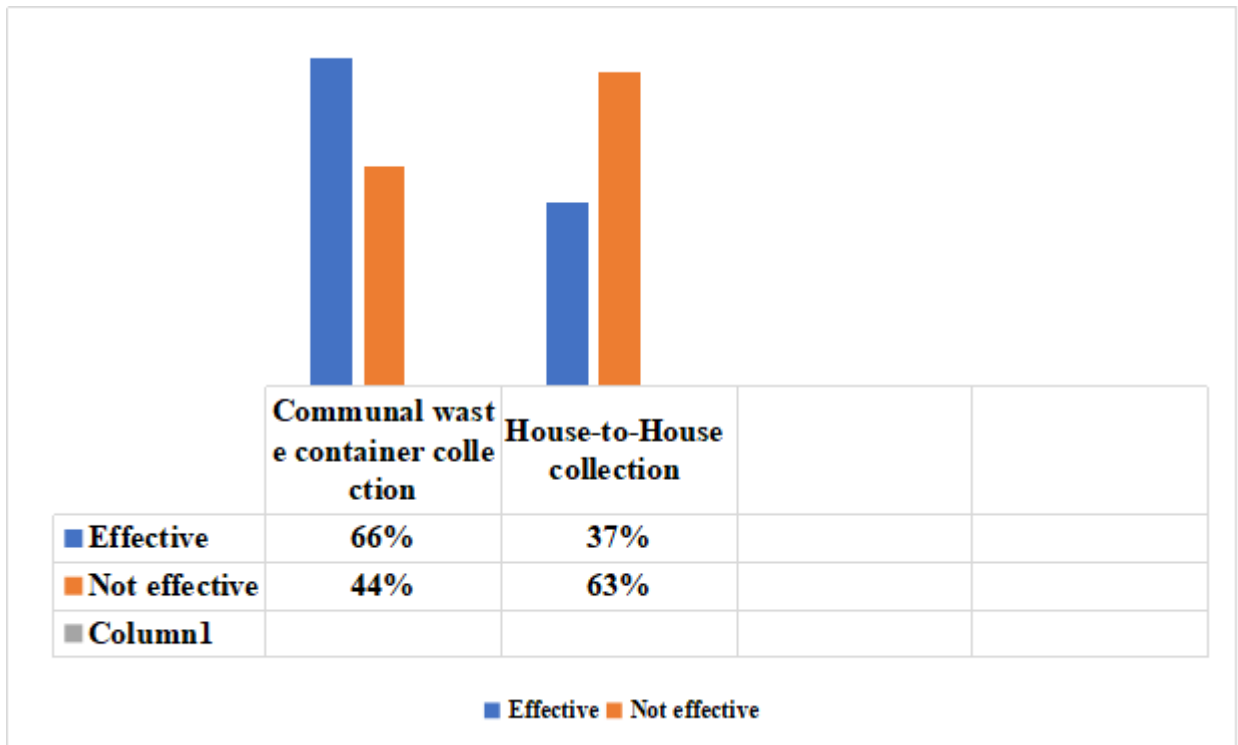


Figure 4.7: Effectiveness of solid waste management strategies

Source: Author’s Fieldwork, 2019

Respondents were quizzed on how they placed private sector participation in the management of solid waste on a five-point Likert scale as effective, very effective, not sure, not effective and very not effective. It was revealed that greater majority of the respondent of 42% indicated it to be effective. Also, 38% of the respondents had it that the participation of the private sector in solid waste management is very effective. This means that 80% of the respondents reconcile their argument on the assertion that the private sector participation in the township is very key to their waste management. This is what the Municipal Health Director had to say:

“Indeed, it would have been worse had it not been the private sector joining forces with the Municipal Assembly. Even with that, look at the area, the open spaces and in some uncompleted buildings...it is very pathetic but we still give credit to the private sector”.



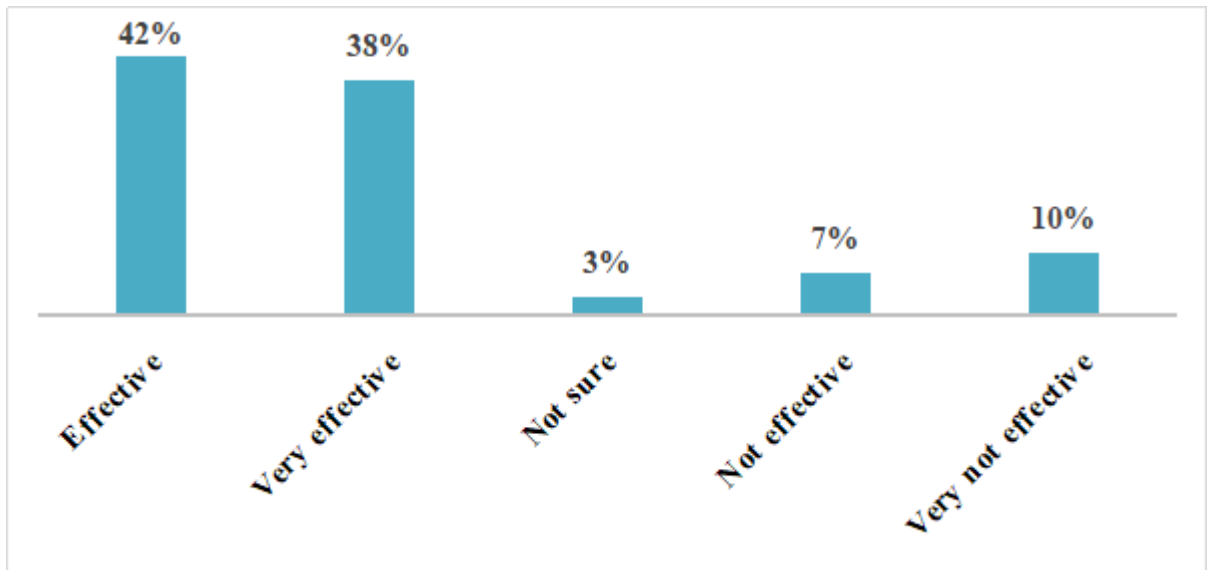


Figure 4.8: Assessment of private sector participation in solid waste management

Source: Author's Fieldwork, 2019

This means that, in spite of the challenges faced by key waste management stakeholders in the township, there has been several insistent positive activities that keeps the management of solid waste in the township in good direction. It was further revealed that 2% of the respondents said they were not sure, 7% indicated that the private sector was not effective and the remaining 10% had it that their operations and activities were not very effective in the township of Wa. This was what a small business owner had to say:

“We suffer a lot from the location of this very communal waste container (see Plate 4.5)...they hardly come around to empty it...because of that we have contracted a lot of diseases, more flies among others...we mobilized to inform them but they told us that they have infrastructural challenges so we should hold on until they finish working on their car”.





Plate 4.5: Communal collection container full and not emptied

Source: Author's Fieldwork, 2019.

This affirms why people are used to setting fire in some communal containers or dump wastes around them. Even some are prevented by concerned citizens not to bring in waste until the containers are emptied. On the other hand, it was revealed by a Field Officer of the Wa Municipal Assembly that:

“Some of the registered clients, who have arrangements with Urban Waste, sometimes owe them too much and hence they potentially instruct their workers not to go for their wastes until they honour their obligations”.

He revealed that it was a major reason why their operation was often hampered which sometimes affect innocent people in the town.

4.5.1 Private sector participation performance score

In assessing the effectiveness of solid waste management practices by the private sector in Wa, respondents were asked to rate the private sector on a five-point scale from very poor to excellent in terms of service quality. From Table 4.4, a service quality performance score of between 80 and 100, representing 7%, was indicated by



the respondents. This suggests that they were happy with the level of private sector participation in solid waste management. It was revealed that majority of the few individuals who had this sentiment on private sector level of participation were the high-income class in the township. An aggregate score between 0 and 19, representing 5%, was aligned to the assertion that participation of the private sector was very poor in their solid waste management practices. Respondents constituting 22% scored between 20 and 39 indicated poor level of private sector participation in waste management in the township.

Table 4.5: Performance score of private sector participation in waste management

Remarks	Scores	Frequency	Percentage (%)
Excellent	80-100	25	7
Very Good	60-79	108	28
Good	40-59	145	38
Poor	20-39	84	22
Very Poor	0-19	20	5
Total	100	382	100

Source: Author's Field Work, 2019

According to a food vender:

“Sanitary conditions and spill over of waste at bins/containers have been very deplorable and looks as if there are no waste managers in the town”.

This means that such spill overs from waste bins, containers and other storage materials affect communal and house-to-house collection. This therefore, affects the



health status and aesthetic conditions and is becoming a nuisance in the town. However, majority (66%) of the respondents were of the view that, the performance of private sector participation in solid waste management has been good.

4.6 Challenges Facing the Private Sector in Managing Solid Waste in Wa

Data on the challenges encountered by the private waste management organizations were sourced from key informants from Zoomlion/Urban Waste and the Wa Municipal Assembly. Individual household respondents also expressed their views on what these challenges were. Basically, the challenges as identified by the key informants and household respondents were categorized under Operational, Organizational, and Community-based challenges. Respondents were asked to assess the infrastructural level of the private waste managers in the town (see Figure 4.9). It was revealed by 46% of the household respondents that inadequate infrastructure was a challenge. Also, 40% of the respondents *strongly agreed* to the assertion that there were several challenges with respect to the level of infrastructure available for the private waste managers in the township. This was what a hawker revealed during the study:

“On the streets what we normally see is waste on the road. Some of the waste tracks are not covered with nets hence some wastes outflow onto the streets. Also, the nature or state of the containers permits outflow of wastes onto the streets”.

This was supported with the outcome from a focus group discussion which revealed that, the use of communal containers was as equal to them doing open dumping in their area. The reason is that the container designated to them was in poor condition, very tall to reach, and the poor nature of the ladder, among others. This affirmed the interview responses received from the Director of Urban Waste Company:



“The company had distributed about 3,000 waste bins, 30 communal containers, one track, three tricycles, three bin track lifters and three communal container lifters in the township and yet achieving cleaner environment is a problem in the township”.

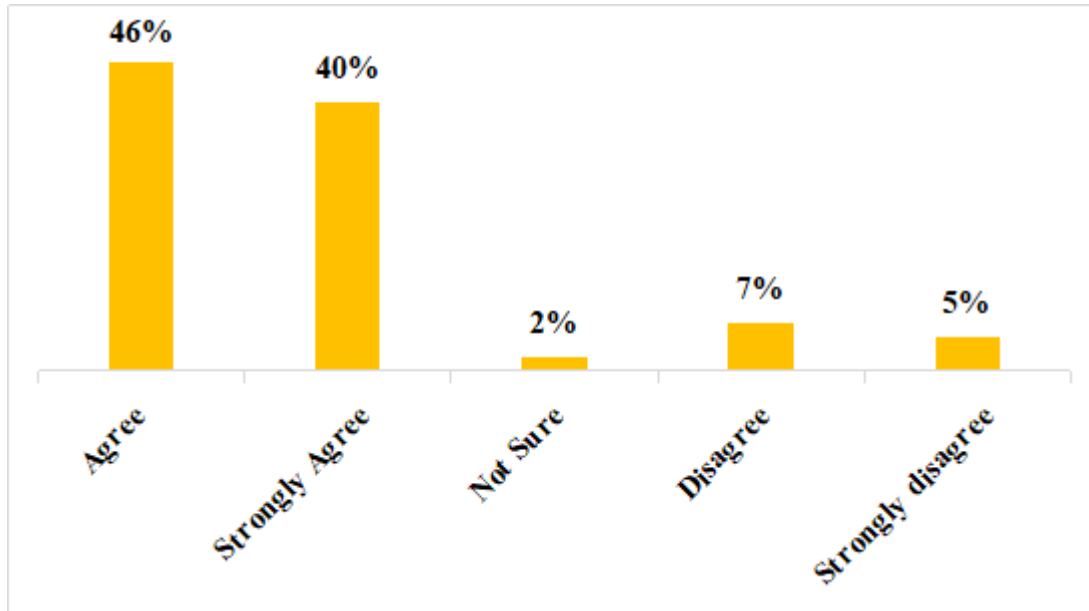


Figure 4.9: Private sector infrastructural challenges

Source: Author’s Fieldwork, 2019

A smaller section of the respondents indicated that they disagreed and strongly disagreed to the assertion that the private sector was challenged. It was linked to the smaller group who were living in the high-class areas and had their waste frequently collected and disposed by the private waste managers in the Wa Town.

The private sector workers were asked on a five-point Likert scale to determine the extent of the challenges affecting their operations in the management of solid waste. It was assessed on a scale of 1-5 as follows; (1) agree (2) strongly agree (3) not sure (4) disagree (5) strongly disagree. From Table 5.5, operational challenges faced by the private sector were the highest with a mean of Relative Important Index (RII) of 0.88. This covered the following challenges by the private sector; land acquisition



problems, inadequate skilled personnel and poor government participation which all had 0.99, 0.87 and 0.82 mean of relative important index respectively. This was what a director in one of the institutions contacted had to say:

“It is very difficult for the smooth operation of many private sector initiatives in the Wa Town or township to be carried out...there are scarcely participation of the government, and the people coupled with limited expertise in the town”.

This means that operations of the private sector are hugely affected with uncounted challenges. Organizational challenges were 3rd with respect to the relative importance index with a mean of 0.69. The study revealed that inadequate logistics, poor payment of workers, and lack of political will were accumulated individually to unveil the organizational challenges faced by the private sector in solid waste management.



Table 4.6: RII of the challenges for the private sector

Challenges	RII	Mean of RII	Rank
Operational challenges			
Land acquisition problems	0.99	0.88	1 st
Inadequate Skill personnel	0.87		
Poor government participation	0.80		
Organizational Challenge			
Inadequate logistics	0.67	0.69	3 rd
Poor payment of workers	0.76		
Lack of political will	0.70		
Financial challenge	0.65		
Township challenges			
Improper dumping of waste	0.86	0.80	2 nd
Poor home-base-management	0.74		
Poor communal services	0.80		

Source: Author's Fieldwork 2019

This was what a 43-year-old worker with Urban Waste had to disclose:

“It will sadden you to know the amount they pay the street sweepers, the track drivers and the waste monitors. All the money, according to the managers, go into the management of the waste and the equipment used in managing them”.



This therefore serves as a hindrance for the youth to participate in solid waste management in the town and does not also motivate the other key institutions to participate. Also, the township challenges were the 2nd with a mean of 0.80 in the area of; improper dumping of waste, poor home-base-management and poor communal services had a mean of 0.86.

4.7 Chapter Summary

This chapter discusses all the field data solicited from the respondents covering the background of the respondents and all the objectives of the work. This was discussed in themes to cover all the important aspects of the topic under discussion. This chapter was deemed to be relevant because it aided very understanding embedded in the work for readers.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This last chapter details with a summary of major key findings of the study, conclusions and offers some recommendations for private sector participation in solid waste management in Wa. This summary, conclusions and recommendations are captured according to themes or the key objectives of the study.

5.2 Summary of Major Findings

The background of household respondents covered marital status, sex categories, level of education, occupational characteristics and the number of people within a household. It was revealed that females dominated the respondents constituting 51%. This was in line with the regional share as well as the national share of the population indicating that females dominate the population of Ghana. However, it was also a reflection of the fact that the males in the study area had little dealings with waste management in the household. It was revealed that a greater majority of the respondents were between the ages of 18-60 years constituting 91%.

The study indicated that a huge section of the respondents was either divorced or single. The divorced constituted 11%, widows/widowers (16%) and singles (31%). In the area of education, majority of the respondents (72%) had some form of formal education. Occupational characteristics of the respondents had it that most of the respondents were farmers and traders representing 54% and 31% respectively. Others (15%) were service professionals. There were large household sizes in the township with 26% living in households of 7-10 people and 39% living in households of 11-20 people.



The study revealed that an appreciation portion (50%) of the solid wastes generated in Wa was from the households. It was also indicated that 20% waste generation were partly emanating from commercial activities, 14% from the service sector and the remaining 15% from the agricultural sector. On the types of solid wastes generated, it was revealed that 50% of the solid wastes generated at the household level were food wastes, 12% were paper/cardboard, 16% plastic, glass, metal waste, 17% textile and 5% consumer electronic. On the physical state of solid wastes in Wa, 80% of the respondents indicated that their wastes were solid in nature.

On storage of solid wastes in homes before dumping, 46% of the respondents stored their wastes in jute sacks, 15% stored them in old basket, 11% used broken baskets while 28% stored their wastes in bins (either privately acquired or publicly given by waste operators). It was further revealed that 46% of the respondents deposited their household waste into bushes and open spaces, and 24% disposed their wastes by depositing them in uncompleted buildings. A few (13%), however, indicated that their wastes were sent to communal waste collection points and 17% used the open dumping system.

The results further revealed that 53% of the respondents associated solid waste management in Wa to Zoomlion Ghana Limited or Urban Waste Company. Also, 31% of the respondent mentioned the Municipal Assembly as being responsible for solid waste management in the Wa Township. Only 9% had it that private individuals were spearheading the management of solid waste in the township. Again, 7% of the respondents were of the view that other entities that are springing up in the town, such as the 'motor king' and wheel barrow cash and carry collections helped in solid waste management. The findings revealed that 78% of the respondents indicated that the private sector embarked on street sweeping. Also, 81% of the respondents revealed



that, house-to-house collection had been one of the mantras of solid waste management by the private sector. Moreover, 76% was of the view that private waste managers in Wa transport waste containers filled with solid wastes to the landfill site. On how the private sector motivates households to participate in solid waste management, 12% of the respondents were of the view that the private sector provides them with waste bins. According to them, this has been very helpful for them to store their wastes for collection in a three-day interval to the landfill site with minimal cost. The study sought to assess the effectiveness of the private sector in the management of solid wastes in Wa and 66% of the respondents indicated that the use of communal waste container collection was effective in the township where as 44% indicated otherwise. Also, 63% of the respondents were of the view that embarking on house-to-house collection was not effective while 37% thought house-to-house collection was effective. On a performance score, 66% of the respondents indicated very good and good to the operations of the private sector in the management of solid wastes in Wa.

The challenges facing the private sector were assessed and the findings revealed that 46% of the respondents agreed that the private sector was challenged in terms of infrastructure. Also, 40% strongly agreed to this assertion of infrastructural challenges faced by the private sector. Very few (11%) of the respondents disagreed with the assertion. On a relative important index scale, the responses were ranked and operational challenges faced by the private sector were the highest with a mean of Relative Important Index (RII) of 0.88. This covered the following challenges; land acquisition problems, inadequate skilled personnel, and poor government participation, which all had 0.99, 0.87 and 0.82 mean of relative important index respectively. Also, the township challenges were the 2nd with a mean of 0.80 in areas



of improper dumping of solid wastes, poor home-base-management, and poor communal services with a mean of 0.86. Organizational challenges were 3rd with respect to the relative importance index with a mean of 0.69.

5.3 Conclusions

The study has unveiled the dominance of females on issues of solid wastes management in Wa. The study has also shown various dynamics in different components of waste generated in the Wa Township and the several management strategies. The dominant waste generated in the town was solid waste including food, plastics, paper, metal and others. The non-biodegradable nature of some solid wastes, the nature of the environment as well as the per capita waste generation in the township has made solid waste management very difficult. Indisputably, several plastic wastes fly around in the township to dirty environments which called for private sector interventions. Again, with the diverse nature of waste generated in the town, several home-base strategies were adopted, such as open dumping system, dumping in uncompleted buildings, backyard burning, community skip containers, and others.

Effective solid waste management is a collective and sheared responsibility between institutions (private and public), households, individuals and the community at large. This study has shown that solid wastes generated in Wa were above the management capacities of households and the Wa Municipal Assembly, hence the need for the private sector to be involved in the management of solid waste in the Town. The private sector is mainly into street sweeping, house-to-house waste collection, and communal waste containers.



In spite of the successes chalked by the private sector in its quest to managed solid waste, there exist numerous challenges such as inadequate personnel, non-payment of charges by clients, inadequate infrastructure, poor maintenance culture, and inadequate waste management logistics. These challenges calls for a proper Public-Private Partnership (PPP) planning that will fashion out all these drawbacks in the town. However, the poor enforcement of regulations on environmental sanitation, poor coordination of defined roles and responsibilities of key actors and relevant stakeholders is also a challenge. The challenges also include the poor state of engineered disposal sites and the lack of waste treatment plants, inadequate haulage equipment and the lack of expertise and appropriate technical know-how. With weak financial capacity, waste management is increasingly becoming expensive in the town.

5.4 Recommendations

This study recommends the following procedural paths which will, to a large extent, contribute to the management of solid waste in the Wa Township.

- ✚ Adequate logistics such as compactors, pay loaders and skip containers, waste bins should be provided by the Wa Municipal Assembly at subsidized prices for the private waste management companies in Wa for efficient and effective solid waste management.
- ✚ Every communal container should have an inspector for assisting and directing how wastes should be deposited into the container to avoid spill over and at the same time sending signal to waste managers to empty it when the container is full.



- ✚ Communal containers should be placed at least within at most 50 meters radius of houses in the residential areas that are low class to improve easy accessibility. This will motivate households to spend minimal time to trek to waste to the skip site.
- ✚ There should be adequate waste bins in both high- and low-income areas by the private waste company in the township (Zoomlion/Urban waste). Beneficiaries should also be given standby waste bins to cater for waste overflow. This will also discourage the practice of storing refuse in polythene bags because of inadequate waste bins.
- ✚ There should be regular collection of solid waste by the Zoomlion and Urban Waste in all areas (middle- and low-income class areas) to prevent solid waste heaping and overflowing of communal waste containers.
- ✚ There should be communal awareness through the involvement of households and enforcement of by-laws on illegal/indiscriminate dumping by the Wa Municipal Assembly.
- ✚ There is the need for private waste management companies to educate communities and households on waste reduction and waste recycling.



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APPENDIX A

QUESTIONNAIRE

**PRIVATE SECTOR PARTICIPATION IN SOLID WASTE MANAGEMENT
IN THE WA TOWNSHIP**

APPENDIX 1

**Structured Interview and Questionnaire Schedule for Sampled Household
Heads.**

Section/Area in the township

This Research Instrument is designed to seek relevant primary data for the conduct of an academic study on the topic Private sector participation in solid waste management in the Wa Township. The research is conducted in partial fulfillment of obtaining an MPhil Degree in Development Studies from the University for Development Studies, Wa Campus. Your support and co-operation are very much expected and please be assured that your responses will be treated with the utmost confidentiality. Please provide the right answers by either ticking or writing in the spaces provided.

Section (1) BACKGROUND INFORMATION OF RESPONDENT

1. AGE

Code	Response	
1	18 - 35 years	[]
2	36 - 45 years	[]
3	46 – 59 years	[]
4	60 years and above	[]



2. SEX

Code	Response	
1	Male	[]
2	Female	[]

3. MARITAL STATUS

Code	Response	
1	Single	[]
2	Married	[]
3	Divorce	[]
4	Widow/Widower	[]
5	Co-Habiting	[]

4. LEVELS OF EDUCATION

Code	Response	
1	Basic	[]
2	S.H.S	[]
3	GCE O'/A' Level	[]
4	Tertiary level (College, Polytechnic, University)	[]
5	None	[]
6	Others specify



5. WHAT IS YOUR OCCUPATION

Code	Response
1	Farming []
2	Trader []
3	Teaching []

6. HOUSEHOLD SIZE

Code	Response
1	1 – 3 []
2	4 – 6 []
3	7 – 10 []
4	Other specify

7. DO YOU HAVE A WASTE BIN OR CONTAINER?

Code	Response
1	Yes []
2	No []

8. IF YES, WHO SUPPLIED YOU WITH THIS WASTE BINS?

Code	Response
1	Municipal assembly []
2	Waste companies []
3	Bought it []



4	Others (Specify
---	-----------------	-------

9. IF NO, HOW DO YOU KEEP YOUR WASTE?

Code	Response
1	Jute sacks []
2	Old baskets []
3	Broken buckets []
4	Others (Specify)

10. WHERE DO YOU KEEP YOUR WASTE BINS IN THE HOUSE?

Code	Response
1	At the backyard []
2	At the gate []
3	At the yard []
4	At the kitchen []
	Others (Specify)

11. HOW MANY HOUSES CONTRIBUTE WASTE TO CENTRAL CONTAINERS?

Code	Response
1	50-100 []
2	100-150 []
3	150-200 []



4	Above 250 houses
---	------------------	-------

12. SOURCES OR GROUNDS OF GENERATION

Code	Response	
1	Residential	[]
2	Commercial	[]
3	Industrial	[]
4	Agricultural	[]
5	Services	[]

OBJECTIVE ONE; WHAT ARE THE FACTORS THAT INFLUENCE WASTE MANAGEMENT IN THE WA TOWNSHIP?

13. WHAT TYPES OF WASTE GENERATED IN YOUR HOUSEHOLD?

Code	Response	
1	Food waste	[]
2	Papers or cardboard	[]
3	Plastic, glass, metals	[]
4	Textiles	[]
5	Social waste (bulky items, consumer electronics)	[]

14. PHYSICAL STATE OF WASTE MATERIAL IN THE TOWNSHIP



Code	Response
1	Liquid []
2	Solid []
3	Gaseous []
4	Radioactive []

15. AREA OF STAY IN THE TOWNSHIP

Code	Response
1	High-income area []
2	Low-income area []
3	Middle income areas []

16. WASTE GENERATED IN KILOGRAM PER HOUSEHOLD

Code	Response
1	0.4 kg- 0.5kg []
2	0.24kg-0.21 kg []
3	0.35kg- 0.9kg []

17. MATERIAL COMPOSITION OF SOLID WASTE GENERATED IN THE WA TOWNSHIP

Code	Response
1	Organic food []



2	Paper	[]
3	Plastic, glass, metal	[]
4	Textiles	[]
5	textile waste	[]

OBJECTIVE TWO; HOW ARE THE STRATEGIES PUT IN PLACE BY THE PRIVATE SECTOR TO ENSURE SOLID WASTE MANAGEMENT IN WA TOWNSHIP?

18. DOES SOMEONE COME TO YOUR HOME TO COLLECT THE WASTE?

Code	Response	
1	Yes	[]
2	No	[]

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19. IF YES WHO/WHICH COMPANY DOES THAT.....

.....

20. IF NO, WHERE DO YOU DUMP YOUR HOUSEHOLD REFUSE (SOLID WASTE)?

Code	Response	
1	Open dump	[]

2	Communal collection site	[]
3	Uncompleted building around	[]
4	Bushy open space around	[]
5	Other (specify)

21. WHO CARRIES THE WASTE BINS TO THE DISPOSAL SITES (BOLA)?

Code	Response
1	Children []
2	Women []
3	Maid []
4	Others specify

22. DO YOU DO SOURCE SEPARATION YES/NO

23. DOES SOURCE SEPARATING OF WASTE AT THE HOUSEHOLD LEVEL ATTRACT INCENTIVES?

Code	Response
1	Yes []
2	No []

24. IF YES, WHAT TYPE OF WASTE NORMALLY DOMINATE IN WHAT YOU



COLLECT?.....

25. WOULD YOU BE WILLING TO GAIN ANY INCENTIVES FOR SOURCE SEPARATING OF WASTE?

Code	Response
1	Yes []
2	No []

26. DO YOU AGREE TO ENCOURAGE SOURCE SEPARATION OF WASTE AT THE HOUSEHOLD LEVEL?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]

27. WHO IS RESPONSIBLE FOR COLLECTING YOUR WASTE IN YOUR COMMUNITY?



Code	Response
1	Wa Municipal Assembly []
2	Wa District Assembly []
3	Zoom lion /Urban Waste []
4	Others specify

28. DO THEY COVER THE LOADED TRUCK OF REFUSE WITH NET?

Code	Response
1	Yes []
2	No []

29. IF NO, WHAT IS THE IMPLICATION?

.....

30. WHAT ARE THE COMMON PRACTICES OF PRIVATE WASTE MANAGEMENT COMPANIES IN WA

Code	Response
1	Street sweeping []
2	house-to-house solid waste collection []
3	transportation of communal solid waste containers []
4 Others specify

31. DO YOU AGREE THAT SANITARY LANDFILL IS A GOOD WASTE MANAGEMENT STRATEGY FOR THE TOWNSHIP?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]



32. DO YOU AGREE THAT RECYCLING IS A GOOD WASTE MANAGEMENT STRATEGY FOR THE TOWNSHIP?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]

33. HOW OFTEN DO YOU DISPOSE OF YOUR HOUSEHOLD WASTE?

Code	Response	
1	Once daily	[]
2	Once every week	[]
3	Three times a week	[]
4	Others specify

34. BY WHAT MEANS DOES THE PERSON CARRY THE WASTE TO THE BOLA?

Code	Response	
1	Head or hand carrying	[]
2	Wheel barrow	[]
3	Tricycle	[]
4	Others specify

35. WHAT WAS THE STATE OF YOUR SANITATION BEFORE THE WASTE COLLECTION COMPANIES TOOK OVER?



Code	Response	
1	Better	[]
2	No change	[]
3	Worse off	[]

23 HOW DO YOU ASSESS YOUR ENVIRONMENT AFTER THE TAKEOVER OF THE COMPANIES?

Code	Response	
1	Better	[]
2	No change	[]
3	Worse off	[]

OBJECTIVE THREE; WHAT ARE THE CHALLENGES FACING THE PRIVATE SECTOR IN MANAGING SOLID WASTE IN THE WA TOWNSHIP?

36. DO YOU AGREE THAT THE PRIVATE SECTOR IS INFRASTRUCTURALLY CHALLENGED?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]



37. DO YOU AGREE THAT THE PRIVATE SECTOR IS CAPITALLY CHALLENGED?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]

38. DO YOU AGREE MECHENICALLY ON RECYCLING?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]

39. Challenges facing private sector waste management companies in Wa.

Please thick the one appropriate under each factor.



	Factors	TICK (√)	TICK (√)	TICK (√)	TICK (√)
	OPERATIONAL CHALLENGES				
I	land acquisition problem				
II	inadequate skilled personnel				
III	Poor government participation				
	ORGANIZATIONAL STRUTURE				



	CHALLENGES				
IV	Lack of logistic				
V	Poor payment to workers				
VI	Fewer workers for an area of work				
	TOWNSHIP CHALLENGES				
VII	Improper dumping site				
VIII	Poor home-base waste management				
IX	Bad dumping practices				

OBJECTIVE FOUR: TO ASSESS THE EFFECTIVENESS OF THE PRIVATE SECTOR IN SOLID WASTE MANAGEMENT IN WA TOWNSHIP.

40. Which company helps in the management of waste at the household level

Code	Response	
1	WMA	[]
2	Zoom lion/urban waste	[]
3	Private individuals	[]
4	Others specify

41. Where do you Deposit your waste in the municipality?

Code	Response	
1	Waste containers	[]
2	Dump site	[]

3	Behind my building	[]
4	Uncompleted buildings	[]
5	Others specify	[]

42. Are you aware that there is a private organization that help in the solid waste management in Wa

Code	Response	
1	Yes	[]
2	No	[]

43. How effective are these private sectors in its quest to manage solid waste in Wa?

Code	1	2	3	4	5
Response	Effective	Very effective	Not sure	Not effective	Very not effective
Tick	[]	[]	[]	[]	[]

44. How do you agree that in the next decade solid waste challenges will be addressed?

Code	1	2	3	4	5
Response	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Tick	[]	[]	[]	[]	[]



APPENDIX B

QUESTIONNAIRES FOR WA MUNICIPAL /WA DISTRICT ASSEMBLY OFFICIALS

Questionnaire Number.....

Date of Interview (DD/MM/YY)

WASTE GENERATION

1. When did you hand over the collection and dumping of solid waste to private companies?

2. Why did you hand over the collection to the companies?

Inadequate vehicles [] Lack of qualified personnel [] Financial problems [] All the three []

Other (specified).....

3. What was the volume of waste generated in a day, week, and a month before privatization respectively?

4. Before privatization, how many tones of solid waste do you collect in a day?

AMOUNT OF MONEY PAID FOR WASTE DELIVERY SERVICE



5. Did you collect money from waste generators before privatization?

Yes [] No []

6. If yes, how much?.....

7. Do the waste generators pay fees for services rendered at present? Yes [] No []

8. If yes, how much do they pay?

.....

9. If yes, is the fee the same for all waste generators? Yes [] No []

10. If no, why the disparities?.....

11. How do you finance the activities of solid waste collection and disposal at present?

.....

.....

12. What was the monthly expenditure on solid waste collection and disposal before privatization?.....

13. How has your outfit been able to extend its coverage of solid waste collection after privatization?

.....





14. How do you monitor the operations of the companies?

.....

15. What happens to companies that do not live up to expectations?

.....

16. What exactly does the Wa Municipal do now, in terms of solid waste management?

.....

17. What are some of the problems you have identified with the companies in their operations?

.....

18. What do you think can be done to solve these problems identified above?

.....

19. Apart from collection and disposal, do you have any idea about recycling and other options?

.....

20. What are some of the problems affecting the Wa Municipal in the management of solid waste?

.....

21. What do you think should be done to make your operations effective?

.....

APPENDIX C

INTERVIEW GUIDE FOR ZOOM LION/URBAN WASTE LIMITED MANAGER

1. What is the mandate of your organisation in respect/in terms of solid waste management in the Wa Township?
2. How long has your organisation been working on solid waste management in the Wa township?
3. Who are other stake holders you collaborated with in executing/discharging your mandate?
4. What are the solid waste challenges/conditions your organisation frequently encounters?
5. What are operational mechanisms your organisation adopts in dealing with the solid waste challenges/conditions as encounter in Q4 above?
6. What has been the impact of your organization's operations in terms of health and sanitation in the township?
7. What are your organization's general operational challenges in terms of dealing with solid waste management in the Wa Township?
8. What do you think can be done to improve solid waste management in the Wa Township?
9. Do you have any other comments?



**INTERVIEW GUIDE FOR UPPER WEST MUNICIPAL ENVIRONMENTAL
SANITATION OFFICER**

1. What role do you play in terms of solid waste management in the township?
2. What are your observations of solid waste management in the township?
3. Per your observation, how do you access the institutions in charge of working to manage solid waste in the township?
4. How do you influence households' proper management of solid waste?
5. Do you think that your activities are helping the institutions/organisations mandated for solid waste management in the township? Yes or No
6. If yes, how?

**INTERVIEW GUIDE FOR UPPER WEST REGIONAL/MUNICIPAL
HEALTH DIRECTOR**

1. What are the common diseases or complaints that are reported to your facility?
2. Are they related to waste mismanagement? Yes or No.
3. If yes, how? Do you think solid waste play a crucial role in increasing poor health conditions of the population of the township? Yes or No
4. If yes, how do you think the institutions are doing with respect to solid waste management?



5. Are you aware of any institutions that are into solid waste management in the Wa township? Yes or No
6. If yes, what are they?
7. How do you access the performance of the institutions as listed in Q6 in terms of solid waste management?
8. What mechanisms do you suggest for them to improve proper solid waste management?
9. Statistically, what are the trends of reported cases to your facility associated to waste mismanagement in the township?
10. In your own opinion what do you think can be done to improve the situation?

INTERVIEW GUIDE FOR UPPER WEST ENVIRONMENTAL PROTECTION AGENCY (EPA) DIRECTED

1. What role do you play in the management of solid waste in the township?
2. Are there any stakeholder collaborations between your facility and others in the township to manage solid waste? Yes or No
3. If yes, could you list them?
4. How are these collaborations done?
5. What is the nature of solid waste in the township?
6. Apart from EPA, what organisations are responsible for solid waste management?
7. How do you access the private sector operations in terms of solid waste management in the township?
8. How do you access the municipal/district assembly's operation in terms of solid waste

